

**FACTORS INFLUENCING INTEGRATION OF
INFORMATION AND COMMUNICATION TECHNOLOGY IN
THE MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN
KITUI COUNTY, KENYA**

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DECLARATION

This thesis is my original work and has not been presented for award of any degree in any other university.

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DEDICATION

I dedicate this study to my beloved husband Stephen Mumo, my dear children Fedinard Mutisya, Victor Mumo and Joy Mueni and my granddaughter Mitchel Muli.

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LIST OF ABBREVIATIONS AND ACRONYMS

BOG	Board of Governors
BOM	Boards of Management
CFSK	Computers for Schools Kenya
CUE	Commission for University Education
DOTF	Digital Opportunity Task Force
EFA	Education for All
FRSS	Fast Response Survey System
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IFMIS	Integrated Financial Management Information System
IT	Information Technology
ITU	International Telecommunications Union
KEMI	Kenya Education Management Institute
KICD	Kenya Institute of Curriculum Studies
KSSHA	Kenya Secondary Schools Heads Association
LAN	Local Area Network
MHEST	Ministry of Higher Education Science and Technology
MIS	Management Information Systems
NCES	National Centre for Educational Statistics
NCOSTI	National Council of Science and Technology and Innovation
NEPAD	New Partnership in African Development
NETSS	National Educational Technology Service and Support

NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
PTAs	Parents Teachers Associations
SMASSE	Strengthening Mathematics and Sciences in Secondary Education
SMS	School Management Systems
SPSS	Statistical Packages for Social Sciences
TPB	Theory Planned Behavior
TSC	Teachers Service Commission
UNESCO	United Nations Educational Scientific and Cultural Organization
USAID	United State Agency for International Development

ABSTRACT

The purpose of this study was to investigate factors that influence the integration of Information and Communication Technology in management of public secondary schools in Kitui County, Kenya. The study was guided by the following specific objectives: To determine the extent to which ICT has been integrated in management of public secondary schools, determine the influence of principals' related factors in the integration of ICT in management of public secondary schools, establish the influence of school related factors in the integration of ICT in management of public secondary schools and assess the community based factors that influence the integration of ICT in management of public secondary schools in Kitui county. A descriptive survey research design was used in this study. The study was carried out in 58 public secondary schools in Kitui County that have functional ICT infrastructure. This study used sample size table as proposed by Krejcie and Morgan (1970) whereby 58 principals, 58 senior teachers and 266 assistant teachers from schools that have functional ICT infrastructure were selected. All 16 Sub-county Directors of Education and one County Director of Education were selected for the study. The researcher used questionnaires to collect data from principals, senior teachers and assistant teachers while interview schedule was used to collect data from Sub-county Directors of Education and the County Director of Education in Kitui County. The collected data was analyzed using both quantitative and qualitative data analysis approaches whereby both descriptive and inferential statistics were used. Descriptive statistics that was used in this study include percentages and mean. Hypotheses were tested using Pearson's moment of correlation coefficient and Pearson's Chi-square tests for independence. The qualitative data were presented in the form of narrative and integrated within the quantitative data. The findings of the study were; 78% of the principals integrate ICT in school management less frequently; there was a strong negative correlation $r(50) = -0.750$, $p < 0.05$ between principals age and ICT integration, a moderate positive correlation $r(50) = 0.559$, $p < 0.05$ between professional experience and ICT integration. There was a strong positive correlation $r(50) = 0.842$, $p < 0.05$ between computer infrastructure and ICT integration in management of public secondary schools. There was also a significant association ($\chi^2(1, 4) = 49.444$, $p < 0.05$) between community support and ICT integration as well as between school security and ICT integration ($\chi^2(1, 4) = 50.411$, $p < 0.05$). The ANOVA results revealed that the F-ratio ($F=5.397$, $p=.000$) was statistically significant. The study recommended that; the government should introduce compulsory computer training for all principals and teachers. The universities should also make it compulsory for all students being trained as teachers to do a unit on computer, the government should also increase their supply of computers to all schools as well as building computer laboratories for schools and that all schools should have internet connections to enable principals and teachers to use ICT in the school. The government should make it compulsory for all schools to integrate ICT in management.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The study of information technology implementation in organizations and institutions began around 1950s (Clark & Meyor, 2003). These researchers argue that the potential of Information Communications Technology (ICT) to enhance human capabilities and revolutionize the management of organizations was first realized in other sectors of society, mostly in the business world, engineering and the military, other than in education. The importance of ICT contribution is also widely recognized both in the workplace and at home (Maki, 2008; Dawes, 2001; Preston et al. 2000). These are just a few examples which point out that ICT is becoming a vital enabling tool that can no longer be ignored in the management of schools. The components of Information and Communication Technology include print media, electronic media, telephone, telex, e-mail, fax and computers (Ayeni, 2004). Aboderin (2004) define ICT as the broad field of information and communications by means of computer and telecommunication; tools that are being increasingly used for organization or personal information processing in all sectors of economy and the society as a whole.

The importance of ICT in the educational management is quite evident worldwide and especially in Europe and United States of America (Empirica, 2006). Information and Communication Technology was first used in educational

institutions in North America and Europe in 1970s. In these Countries, computers are used to enable successful learning in e-learning and to provide professional development for multiple staff in a learning institution and school management systems (SMS), enabling them to be more effective. Brannigan (2010) argues that in recent times, there has been a global explosion in the use of computers in schools as an instructional, communicative and informational resource tools by use of databases, spreadsheets, multimedia, email, and network search engines.

Due to these rapid changes, managers and other educators globally are compelled to carefully analyze the academic and social needs of their students in line with technology. As such, there is a growing demand on the educational institutions to integrate ICT in all their management endeavors. This can happen through effective integration of technologies into the existing environment in order to enhance professional output as well as the overall management of the school (Muchiri, 2014). Principals therefore have no option but to embrace the use and integration of ICT in their schools. Information and Communication Technology is rich and has new knowledge likely to keep school managers versed with technological techniques in problem solving and as part of injecting the best management practices. According to Okumbe (2001) the principal is charged with the task of managing curriculum and instruction, staff personnel, student personnel, school plant, finances and school community relations. Thus the principals are charged with the responsibility of carefully planning and utilizing the available resources in the school to achieve the institutional goals.

The Economic Commission for Africa has indicated that the ability to access and use information is no longer a luxury but a necessity for development. Gray and Smith (2007) observe that the twenty first century school managers are faced with numerous challenges emanating from ICT integration. Attitude issues as well as lack of ICT competence may affect ICT integration in schools. Pflaum (2004) in his study on ICT integration in secondary school observes that there were a lot of computers at Springdale high school in Ohio City in the United States of America but no school managers committed to ICT integration. As a result, White head, Jensen and Boschee (2003) confirm that the current movement towards putting the latest technology into classrooms is causing school managers to reassess school programs and policies to examine the impact of ICT integration on school management.

Maki (2008) stipulates that ICT integration plays a vital role in supporting powerful and efficient school management in the education sector. In her study in Cyprus secondary schools, she observes that ICT integration is essential for personnel management, student management, resource management, financial management and general management. Maki (2008), in regard to a study by the European Commission in Cyprus reveals that secondary schools in Cyprus integrated ICT as a teaching tool as well as a tool for school management. However, Empirica (2006) observes that although significant steps had taken place in as far as ICT integration in secondary schools in Cyprus was concerned, integration in school management still remained at an early stage. The United

Nations Scientific and Cultural Organization (UNESCO, 2002) provides special attention to the integration of ICT for development. More so urgent and concerted actions internationally have increasingly aimed at ensuring that popularity of ICT in the management of educational institutions and as a result of research work in these institutions is maturing.

In Africa, the first computers arrived in educational institutions by the end of the 1970s (Clark & Meyor, 2003). The use of ICT has not been extensive in school management worldwide as found in other fields, such as business and engineering. The reasons for the low adoption or absence of ICT in school management vary significantly depending on the prevailing circumstances. African countries have only recently begun to show the micro economic stability needed for education development and therefore the need to integrate ICT in educational management has become real more than ever before (Nduati & Bowman, 2005). According to Zainally (2006) ICT integration provides facilities and possibilities for the education managers to perform their tasks. In this regard, ICT integration can be realized in student management for example students' records and management of other resources in an education system. Wiley (2003) notes that school principals need effective and fast communication and accessibility to information. This is because school managers need to correspond through email and the internet, create websites for school marketing so as to communicate to parents, other school administrators, business executives, school suppliers and the wider community.

Uwadia (2009) emphasizes that ICT serves as a tool for increased productivity and effective decision making. For instance, the knowledge of ICT can be explored by the secondary school managers to ensure effective delivery of services, enhanced communication, proper maintenance of students' record system and maintaining academic planning among others. He further observes that in the school system today, it seems impossible to ignore the place of ICT hence school managers are faced with the challenge of incorporating ICT into the management of schools in meaningful and productive ways.

Information communication technology can improve or enhance management duties of a school principal (Agabi & Uche, 2006). For instance, computer as one of the ICT facilities can provide better management results. It is also the duty of the school management to monitor the enrollment of students in the school, availability of educational resources, human labor and availability of finance to sustain the daily activities of the school. Alexis (2003) argues that school management has to monitor all these records of the school activities by entering the details manually on the books and records of the schools. But with the introduction of ICT, there are various programs that can be used to ease the burden of management in monitoring and managing the school activities hence these programs help the school management to monitor daily activities in the school by click of a button.

Kenya has deliberately made a number of attempts to develop a national ICT policy. The culmination of these efforts has been the development of the E-government Strategy, National ICT Draft Policy, and the issuance of the National Access Report (Outa, Eta & Aligula, 2006). In the education sector, ICT policy in Kenya is embedded in the E-government Strategy and National ICT draft Policy documents. These documents form the basis for the policy guidelines in the Sessions Paper No. 1 of 2005 which is the policy document that guides ICT integration in education in Kenya. This policy document is operationalised through the National ICT Strategy for Education and Training (2006) which contains the strategies for integration of ICT in the education sector. It has an elaborate implementation timeframe that spans five years starting from the year of inception, 2006. The ICT for education strategy document indicates that there are a number of challenges concerning access to and use of ICT in Kenya including limited rural electrification, high poverty levels and frequent power disruptions.

Kenya is in the process of implementing Information and Communication Technology (ICT) in schools. The government recognizes the positive impact of ICT in making the country a middle level economy as is envisaged in Kenya vision 2030. The government has disseminated several policies and guidelines that guide ICT implementation. ICT integration in secondary school environment is considered to be part of the extensive technological modernization of school management and education as well as the electronic government (Ministry Of Education Science and Technology, 2005). The introduction of innovative

technological applications in schools is connected with changes not only at the school level but also in carrying out other management tasks. The creation of various institutional websites has become the order of the day in the Ministry of Education, Science and Technology (Gakuu & Kidombo, 2010). Considering aspects of education systems like registration for examinations, accessing results and acquiring any piece of information about institutions and programmes require that online operations be engaged for efficiency. For the above benefits to be reaped the school principals should provide technological support and visionary leadership (Hayes, 2007).

Despite Kenya government support for ICT integration in schools and the many benefits associated with ICT integration in the management of schools, access and availability of ICT in public schools in Kenya and Kitui County in particular is still patchy. Fullan (2003) advises that there is an urgent need to discharge the sophistication of change to provide guidance for those who must deal with it. This has also been highlighted by Day and Leithwood (2007) in their remark that this is the '*golden age*' of school leadership change. Educators thus should re-examine their attitudes, perceptions, plans, and implementation of ICT in their daily management operations however challenging it might be. This is central to the success with which privileged solutions actually work in schools. Hence school managers as key educators have to embrace this new technology for effective management.

1.2 Statement of the problem

While some countries have reported up to 41% of ICT integration in school management and teaching/learning, the proportion remains substantially low in Kenya despite the huge amounts invested in ICT (Muchiri, 2014). Makhanu (2010) observes that there is massive investment in buying ICT infrastructure. The government has also put in efforts to supply computers, construct computer laboratories, train teachers in some schools and mobilize support from development partners.

Ordinarily, public secondary schools, compared to public primary schools, possess some essential ICT resources and are generally endowed with more financial resources which may be used to acquire basic ICT equipment and software. A study done by Maduku, Kosgey and Sang (2006) indicate that ICT integration and use in schools in Wareng District is average. According to Mue (2006), most of the public secondary schools in Lang'ata have embraced Information and Communication Technology in the administration of human resources for instance, in monitoring attendances, performance, staff training and recruiting of the staff. Nevertheless, it is observed that most schools' operations in Kitui County are still manual and ICT equipment is used for mundane activities like typing examinations, letters and for entertainment. According to the Kitui County Education Office (2015), out of the 375 public secondary schools in the County, only 58 of them, (15%) have integrated ICT in school management (Kitui

County Education Office, 2015). According to the report, Integrated Financial Management Information System (IFMIS) is never used, emails are rarely used and ICT technology is ignored in performance of most of the management tasks. Failure to take full advantage of the opportunities offered by technological advances to education represent a drastic lag in skilled innovative manpower (Ministry of Education Science and Technology & National Council for Science and Technology, 2010).

In Kitui County, ICT integration in education has focused mainly on learners rather than the managers. This has been done through sensitization of teachers on ICT integration in teaching through Strengthening Mathematics and Sciences in Secondary Education projects (SMASSE) (County Director of Education report, 2015). However sensitization of principals on ICT integration has not been prioritized. Studies done in the County have focused on the integration of ICT in teaching and learning in secondary schools (Kuvuuka, 2013; Mulwa, 2012; Ndirangu, 2013). However, no study known to the researcher has been done on the factors influencing the integration of ICT in the management of public secondary schools in Kitui County hence the need for this study.

1.3 Purpose of the Study

The purpose of this study was to investigate the factors influencing ICT integration in the management of public secondary schools in Kitui County, Kenya.

1.4 Research Objectives

The study was guided by the following objectives:

- i. To determine the extent to which ICT has been integrated in the management of public secondary schools in Kitui County, Kenya.
- ii. To determine the influence of principals' personal characteristics on ICT integration in the management of public secondary schools in Kitui County, Kenya.
- iii. To establish the influence of school related factors on ICT integration in the management of public secondary schools in Kitui County, Kenya.
- iv. To assess the influence of community related factors on ICT integration in the management of public secondary schools in Kitui County, Kenya.

1.5 Research Question

- i. To what extent has ICT been integrated in the management of public secondary schools in Kitui County, Kenya?

1.6 Research Hypotheses

The study was guided by the following research hypotheses:

- H₀₁: There is no statistically significant relationship between principals' age and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₂: There is no statistically significant association between principals' gender and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₃: There is no statistically significant association between principals' level of education and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₄: There is no statistically significant relationship between principals' professional experience and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₅: There is no statistically significant association between school type and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₆: There is no statistically significant relationship between ICT infrastructure and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₇: There is no statistically significant relationship between availability of technical staff and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₈: There is no statistically significant association between teachers' ICT skills and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₉: There is no statistically significant association between community support and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₁₀: There is no statistically significant association between school security and ICT integration in the management of public secondary schools in Kitui County, Kenya.

1.7 Significance of the Study

This study may be of benefit to the Ministry of Education in the formulation and reviewing of policies for implementation of ICT integration in the management of secondary schools. The enhancement of strategies or desertion of ineffectual options would eventually lead to the development of an effective policy to guide the integration of ICT in the management of Kenyan schools. This study would also be useful in the sensitization of principals on the potential of ICT as a tool for enhancing management in Kenyan secondary schools and thereby improving efficiency. The Kenya Education Management Institute (KEMI) may use the findings of this study to identify areas which urgently need to be addressed during the in-service courses for secondary school principals. The Kenya Institute of

Curriculum Development (KICD) and the Commission for University Education (CUE) may use the findings to facilitate further improvements in teachers' training curriculum to equip potential principals with requisite management skills in ICT-mediated schools. Teachers Service Commission (TSC) may use applicants' e-leadership skills as basis for recruitment, selection and promotion of principals. Kenya Secondary schools Heads Association (KSSHA) may use the findings to enrich principals' seminars and conferences.

The findings from this study may be beneficial to the education policy makers in Kitui County in reviewing their policies so as to make as many secondary school principals effectively integrate ICT in school management. The findings may be pertinent to schools' Boards of Management (BOM) and the Parents Teachers' Associations (PTA) in drawing up future strategic plans, raise funds to procure ICT resources and other management decisions on the use of ICT. The findings too may contribute to advancement of knowledge and further improvements of Kenya's ICT in Education. The recommendations of this study will be a treasured database for researchers conducting future studies on the factors that influence educational managers in promoting the use of computers, internet and other ICT resources in educational institutions.

1.8 Delimitations of the Study

There are many factors influencing the management of secondary schools but this study was only confined to investigating the factors influencing ICT integration in

management of public secondary schools. The study targeted secondary schools which, according to United State Agency for International Development (USAID, 2006) have made significant progress in ICT integration as compared to primary schools. The study focused on secondary schools which have functional ICT infrastructure in Kitui County. This study confined itself to principals, senior teachers, assistant teachers, Sub-county Directors of Education and County Director of Education as the only source of data. There are many factors that may influence ICT integration but this study limited itself to the influence of principals' related factors which for this study were age, gender, level of education and professional experience of the principal. School related factors included; school type, ICT infrastructure, availability of technical staff in the school and teachers ICT skills while community related factors included; community support and school security.

1.9 Limitations of the Study

According to Orodho (2008) a limitation is an aspect of the study that the researcher knows may adversely affect the results or generalization of the study, but over which he/she has no direct control. One limitation of the study was that some principals were not willing to disclose their level of ICT literacy for fear of ridicule however the researcher assured them of their confidentiality. Some of the respondents were not willing to give information required for the study and this was a limitation. However, the researcher assured the respondents of their

confidentiality and explained to them the importance of the study and their contributions hence encouraged them to participate in the study. The respondents were assured that the information gathered from them would be used only for the purpose of the study.

1.10 Assumptions of the Study

The study was based on the assumptions that there were some public Secondary schools in Kitui County which were using ICT in management. The study also assumed that public secondary school principals in Kitui County have the required knowledge about ICT integration in school management and are using the same to perform various duties in their schools. The study also assumed that the respondents were familiar with Ministry of Education policy on ICT integration in school management. It was also assumed that the respondents were familiar with the concept of ICT integration in school management and therefore information given in the questionnaire would be reliable. It was also assumed that the respondents would willingly give the information required for the study.

1.11 Operational Definition of Terms

Computer: This term is used in this study to refer to a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. Complex computers also include the means for storing data (including the program, which is also a form of data) for some necessary duration.

Computer literacy: In this study, this term refers to the individual knowledge and ability to use computers and related technology efficiently.

Community related factor: This term is used in this study to refer to those influences from the external environment of the school that may impact on ICT integration. For this study they are community support and school security.

Community support: This refers to the financial and moral assistance offered to the school by the members of the community outside the school environment, such as school neighbors, NGOs and CBOs.

E-mature: This term is used in this study to refer to the state of being able to strategically and competitively effectively use ICT to improve educational outcomes.

ICT: In this study, this term stands for Information and Communication Technology.

ICT Infrastructure: This term refers to ICT facilities such as Internet connections, computers, ICT technicians, television sets, CTV Cameras, ect.

ICT Integration: This term is used in this study to refer to the application of information and communication technology such as computers and CCTV cameras in management of secondary schools.

Information technology (IT): This is used to mean design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

Management: In this study, this term is used to mean an act, manner, or practice of managing, handling, supervision, or control of a business or institution.

Operational ICT Infrastructure: In this study this term refers to ICT equipment that are in good working condition and are being used in the school.

Public Secondary school: It refers to secondary schools managed with Government or public funds and by the time of the study had ICT infrastructure.

Principal related factors: These are the principals' personal characteristics likely to influence ICT integration. For this study they are age, gender, level of education and professional experience.

School related factors: In this study, this term refers to aspects within the school environment that are likely to influence ICT integration. For this study they are ICT infrastructure, technical staff, teachers ICT skills and school type.

1.12 Organization of the Study

The study is organized into five chapters. Chapter one consists of the introduction of the study. It captured the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitations and delimitations of the study, assumptions of the study and finally, definition of significant terms. Chapter two deals with the literature review of the previous studies by other researchers on ICT integration in management of schools, theoretical and conceptual framework. Chapter three consists of research methodology. The researcher formulates the research design, target population, sample size and sampling procedure, research instruments, pilot testing, validity and reliability, data collection procedures, data analysis and ethical consideration. Chapter four consists of data analysis, interpretation, and discussion of research findings. Finally chapter five forms the summary, conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents detailed information on literature review on the integration of ICT in management of public secondary schools. It consists of the following sections: ICT integration and management of public secondary schools, principal related factors and ICT integration in management of public secondary schools, school related factors and ICT integration in management of public secondary schools and community related factors and ICT integration in management of public secondary schools, summary of literature review, theoretical frame work and conceptual framework.

2.2 ICT Integration and Management of Public Secondary Schools

ICT integration in management of schools refers to the extent to which information and communication technology have been adopted into the school environment and the degree of impact on the school's organization. The level of integration is determined by the interplay between the infrastructure, teacher motivation, innovations and development of e-pedagogies. Information and Communication Technology (ICT) has become a vital tool of day-to-day life and pecuniary activity in the contemporary world. The on-going technology revolution encompasses new ways of capturing, processing, storing and

displaying information and is capable of increasing productivity and competitiveness through information provision (Mangesi, 2010). The importance of ICT is widely recognized both in the workplace and at home (Preston & Cox, 2000). More so, ICT has been affiliated with the ability to integrate world economies and its role in the effectiveness, efficiency and service delivery of any institution is undoubtedly vital. ICT has also contributed greatly to educational management in schools worldwide (Zhao & Frank, 2003). According to Maki (2008), ICT plays a vital role in supporting powerful efficient management and administration in the education sector and it is specified that technology can be used right from student administration to various resource administrations in an educational institution.

There is a trend towards ICT integration in the management of schools in United Kingdom and entire European Union region (Balanskat, 2006). Nevertheless, growth in the ICT application in schools is uneven leading to differences in e-maturity though countries have continued to invest huge amounts of money in the ICT in schools. Up to this day research in UK reveals that only 10 to 15 percent of schools are e-mature. ICT application in schools covers a wider scope (Gwang-Jo, 2009). This includes the comprehensive approach to innovate education systems, methods and management through Information and Communications Technology, restructuring education system, diversifying teaching-learning methods and practices, engaging all stakeholders of education and adapting to rapid changes in

society and the environment and enhancing education efficiency, effectiveness, and productivity.

The use of computers helps school managers to plan and allocate human resource and physical resources more effectively. Ngugi (2012) explains how the ability to connect computers through networks helps principals to work together and share information and thus promoting school-community relationship. For ICT integration programs to be effective and sustainable, managers themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, financial, and social dimensions of ICT use in education. According to Fredriksson and Gajek (2009), ICT plays a key role in the management of complex information flow and integration of such information towards effective policy formulation and planning for the utmost maximization of human capital and potential in the school environment. Thus, it involves the development of effective and integrated tools as well as training modules to enable their application through effective teacher training.

2.2.1 Use of ICT in Educational Management

A report by World Bank Report (2007), affirms that computers have made it possible for teachers to maintain accurate student records, track and analyze performance and use the resulting information to make decisions about how to individualize instructions. Burdensome and tedious record keeping takes time away from more important tasks and inhibits teachers from maintaining records.

Simplifying the process by the use of computers has encouraged teachers to keep better records and more importantly, making use of the resulting information. Before changing the way teachers and schools manage classroom and school records, it is important to evaluate the school's information (World Bank, 2007). ICT may be considered as a synonym for modernization of all organizations, including schools, as they provide for advanced technological tools and applications. Additionally, the implementation of new technologies in secondary education has rapidly increased and adoption of ICT reinforces the teaching process, and by extension facilitates management transactions (Saiti & Prokopiadou, 2009).

Ong and Lay (2006) argue that school principals can embed ICT within teaching, learning, management and planning: develop a vision for the development and integration of ICT across the curriculum and promote this vision within and beyond the school. The principal can provide appropriate, sustained ICT professional development for all levels of staff and become an ICT learner along with the staff. According to Kumar, Rose and D'Silva (2008) integration of ICT helps to reduce the complexity and enhance the overall management of higher education. Computers can be used extensively for effective educational management such as pay roll, financial accounting, student data, inventories, personnel records and library system. It is specified that technology can be used right from student management to various resource management in an educational institution (Maki, 2008). More so admissions can be done through web-enabled

systems and all day-to-day management activities of the institution including staff management can be done by use of ICT.

Uwadia (2009) emphasizes that ICT serves as a tool for increased productivity and effective decision making. For instance, the knowledge of ICT can be employed by the secondary school managers to ensure teachers effective delivery of services, effective communication, effective maintenance of sound students record system and maintaining academic planning record system among others. In the school system today, it seems impossible to ignore the place of ICT anymore. School managers are therefore faced with the challenge of incorporating ICT into the management of school in a meaningful and productive way.

ICT can improve or enhance the management duties of a principal. For instance, computer as one of the ICT facilities can provide better management results. One of the essential aspects of education is to impart culture from generation to generation. School managers plays a critical role in ensuring that education is passed to the students as recommended. It is also the duty of the school management to monitor the enrollment of students in the school, availability of educational resources, human labor and availability of finance to sustain the daily activities of the school (Maki, 2008). Alexis (2003) argues that schools administrations had to monitor all these records of the school activities by entering the details manually on the books and records of the schools. But with the introduction of ICT in the country, there are various programs that can be used

to ease the burden of administration in monitoring and managing the school activities. These programs help the administration to monitor their daily activities in the school by a click of a button.

Manduku, Kosgey and Sang (2006) conducted a study on adoption and use of ICT in enhancing management of public secondary schools in Kesses zone secondary schools in Wareng district of Uasin Gishu county, Kenya. The study adopted a survey research design technique. Six (6) schools were sampled for the study. The target population included 300 head teachers, deputy head teachers, heads of departments and BOG members. 42 respondents which represented 14 percent were sampled. Respondents were asked to indicate ways in which ICT is applied in the performance of management functions in their respective schools. Most of those interviewed, 26 (61.9%) of the respondents indicate that they use ICT in storage of school records 20 (47.62%) on timetabling, 20 (47.6%) on communication, 18 (42.9%) on secretarial duties.

The findings show that ICT is mostly used for record storage purposes, timetabling, communication and secretarial work such as typing examinations and staff meeting minutes in that order. Analysis of both academic results and financial accounting, use of internet and power point presentations recorded very low ratings. It is observed that on the whole, the adoption and use of ICT in Wareng schools is average with a mean of 37.214 and a standard deviation of 8.14 with the respondents score ranging from 22 to 52. When the ICT usage score is

grouped and categorized into low, average and high, it is observed that ICT integration and use in schools in Wareng District is average. The study concludes that despite the benefits, school management has not fully realized the full potential of integration and use of ICT in performing management tasks due to several challenges, among them; lack of skills and financial constraints. Despite the methods, procedures used and the locale, this study identifies a research gap on the factors influencing ICT integration in management of public secondary schools in Kitui County.

2.2.2 ICT integration and Data Management

Educational managers need to have basic information on student and teacher flows, probably also of school supplies, and how much the system is spending on various inputs, in order to make the most basic resource allocation decisions. Undoubtedly, ICT has played an important role in improving data collection in educational systems. It has also made these data more widely available to school personnel, parents, and the public at large through central school management web and in some countries through direct access to central or district databases by school personnel (Organization for Economic Cooperation and Development, 2005). These rudimentary data collection functions are expanded in some countries and regions by more sophisticated quality control data, namely student evaluation data. Maki (2008) in a paper presented in Cyprus on ICT for administration and management of Cyprus secondary schools argues that the

Cyprus Ministry of Education implemented a computer programme developed in Greece in order to manage information in secondary schools in relation to students and teachers data. Schools in Cyprus use ICT for managerial purposes such as student management, (enrollment, absenteeism, grades, final exams), personnel management (absenteeism), human resource management and timetabling.

Carnoy (2004) observes that ICT collects information from and distributes information to the different departments in schools and uses the information to extract greater effort from the different parts of the system. In many countries, such top-down use of ICT to monitor performance could be extended to collecting and disseminating information on student and teacher absenteeism, student attainment and other variables, all on a school-by-school basis (Carnoy, 2004). Maki (2008) observes that organizations and consequently schools depend on information systems to support the flow of data, information and knowledge about inputs, outputs, relationships among different environments.

Mugo (2014) carried out a study to examine the factors that impact on data management using Management Information Systems by education administrators in public secondary schools in Thika West district, Kiambu County. The study adopted a descriptive survey design. The study sampled 10 schools using stratified random sampling based on three mutually exclusive strata; national, provincial, and district. From the sampled schools the head teacher and 4 heads of

departments were selected, and in the district education office 4 officers in charge of data were selected using purposive sampling. Data was collected through self-administered questionnaires and analyzed using quantitative methods.

The findings of the study indicate that 61% of the institutions never used computer software and 44% always used manual method to manage data. 29% indicate calculators were always used to manage data compared to only 6% indicate never. There is low use of computers in data management as only 20% of the respondents indicate that computers were used. This implies low levels of computer literacy and limited use of computers in data management. The findings also note that (75) percent of the officers at the District Education Office, (66.66%) of the head teachers and (52.7%) of Heads of Departments used computers compared to (50%), (22.2%) and (13.8%) respectively using computer software.

This could mean that there are a limited number of education administrators with advanced skills and competencies to use computers in data management and this would lower effectiveness of data. This could also imply that processing of data could be time consuming and scrutiny of accuracy limited. Based on these findings it is recommended that the Ministry of Education and stakeholders enhance training of education administrators to attain the necessary computer proficiency for efficient management of data and step up the provision of infrastructure to support the production of quality data for evidence based policy

formulation. This study however was carried out in Kiambu County hence it identifies a research gap in ICT integration and data management in public secondary schools in Kitui County, Kenya.

A study done by Mue (2006) sought to establish the application of Information and Communication Technology in school administration in selected public secondary schools in Lang'ata Division, Nairobi County. The objectives of the study sought to examine: the extent to which school administrators apply Information and Communication Technology in human resources administration, the application of Information and Communication Technology in school management of physical resources, the extent to which school administrators apply Information and Communication Technology in financial management, challenges facing administrators in application of ICT in school administration and the measures that can be taken to improve the application of ICT. The study adopted survey research design with a target population of four hundred and thirty (N=430). Simple random sampling and purposive sampling procedures were used to arrive at the sample (Students, computer teachers, and the school administrators). In total the sample size was one hundred and thirty (n=130). Questionnaires were used to collect data from the students whereas interview guides were used for the teachers and school administrators. The collected data was analysed using descriptive statistics. Data from questionnaires was purely analysed quantitatively, and presented in frequencies and percentages.

According to the study, most of the public secondary schools in Lang'ata have embraced Information and Communication Technology in the administration of human resources for instance, in monitoring attendances, performance, staff training and recruiting of the staff. In terms of the administration of physical resources, Information and Communication Technology has been limited only to the monitoring of classroom facilities, advertisement of tenders, monitoring lab facilities and stationeries. For financial administration process, most schools are limited in terms of the ICT application. This is mainly because they only apply it in the collection of school fees and salary payment. However, the effectiveness of ICT application in executing management roles in public schools in Lang'ata has been hindered by various issues such as lack of facilities, poor training among key stakeholders, financial constraints and insecurity due to lack of security checkup software for the computers and power outages. Despite the appropriateness of the research methodology, this study is limited in terms of data analysis techniques used and it is carried out in a different locale. However, the study has left out a gap in factors influencing ICT integration in data management in public secondary schools in Kitui County.

2.2.3 The Use of ICT in Communication

A large scale study by School Net in which 69 secondary schools responded found that only 46 per cent of the sampled schools had computers, with availability of Internet and facsimile rare in these schools (Kenya School Net,

2008). The findings also indicate that email was yet to be recognized as a tool for collaboration among students and teachers, and only one school had a website while other two reported having networked all their computers to the Internet. It went on to affirm that in these schools, access to the Internet was severely limited and when available it was only for administrative use. IT is the evidence of the use of ICT in formalizing co-operative planning via the sharing of curriculum plans and the analysis of students' data. Teachers keep records of students work electronically which has led to clearer target settings and improvements in reporting to parents (Fredriksson & Gajek, 2009).

Krishnaveni and Meenakumari (2010) did a study on usage of ICT for information administration in higher education institutions. The study adopted a theoretical model and Pearson correlation test was done to examine the association between the indicators. This study aimed to identify the various functional areas to which ICT is deployed for information administration in higher education institutions and to find the current extent of usage of ICT in all these functional areas pertaining to Information administration. The various factors that contribute to these functional areas were identified. This study identifies a comprehensive set of functional areas of Information administration. The study notes that current level of usage indicates a clear integration of ICT for managerial or information-based administration in higher education institutions. This study reveals that demographic factors do not have major impact on Information administration in higher education institutions it was also evident

from the validation of the path model that all the functional areas identified have an influence on Information administration. This reveals that enhancing the usage of ICT on these functional areas and especially for general administration will enable enhancement of overall information administration in higher education institutions in the realm of global competitive environment.

Etudor-Eyo, Ante and Emah (2011) carried out a study on the use of ICT and communication effectiveness among Secondary School Administrators. The study obtained data from secondary school administrators through the administrators' use of ICT questionnaire and administrators' communication questionnaire to investigate how the use of ICT predicts communication effectiveness among secondary school administrators in Akwalbom State, Nigeria. Two hypotheses were formulated to guide the study. Ex-post facto research design was adopted for the research. The population of the study comprised all the 348 public secondary school principals and vice principals in Akwalbom State, Nigeria. A sample of two hundred and fifty-five (255) principals was drawn from eighty-five (85) public secondary schools through purposive sampling technique.

The results of the study reveal that the extent of administrators' use of ICT and the extent of administrators' effectiveness in communication are high. It notes that there is a significant positive relationship between administrators' use of ICT and administrators' effectiveness in communication; the effectiveness of secondary school administrators in communication is significantly predicted by the use of

ICT. Based on the findings, the researcher concludes and recommends that government should make ICT tools available in all secondary schools for the administrators; workshops on the use of ICT should be organized from time to time by the governments and NGOs for school administrators who are not yet ICT literate; a constant power supply should be made available to schools so that administrators would be able to make use of ICT for communication (Etudor-Eyo, Ante & Emah, 2011). This study identifies knowledge gap in ICT integration and management of public secondary schools in Kitui County in that the said study was carried out in Nigeria and only school administrators were used as respondent while this study is carried out in Kitui County with a variety of respondents.

2.2.4 ICT integration and Personnel Management

Raby (2004) conducted a study on ICT integration in public secondary schools in Uganda. The sample of the study consisted of 12 secondary schools, 12 principals, three education officers, three curriculum developers and 20 students. Qualitative data were collected using interviews of principals, education officers and curriculum developers whereas questionnaires were administered to students. The results of the study reveal that in most public secondary schools, ICT application in human resource management is the responsibility of the school principal.

According to the study, ICT could aid instructional supervision through facilitating decision making process, planning, organizing, communicating,

influencing, coordinating and evaluating. Further the study observes that for a principal running a big school or institution, running various human resource areas like curriculum development, instructional supervision, staff and student, personnel administration, guidance and counseling, finance, community relations, construction and maintenance of facilities and special services could be tasking and time consuming. The study stresses that for the principal to function efficiently and effectively in the present computer age, he/she must rise to the challenge of adopting new technological resources and services in the management of the school. The study by Raby however is carried out in Uganda unlike this study which is done in Kitui County in Kenya hence it identifies a research gap in factors influencing ICT integration in personnel management in Kitui County.

According to Telem (2001) ICT helps in streamlining management processes of the human resource especially in the area of communication. This is whereby, teachers used to refer to big log books to know which rooms were available for booking and who booked same and for how long, but with ICT, they could see the schedule for an entire month and know who booked them and which date the rooms may be vacant. He further notes that ICT is a very important tool for information dissemination. This is because it helps communicate whatever information is available to the staff the moment they log in as they read, know, and act. Abuga (2014) conducted a study on the influence of principals' characteristics on integration of information communication technology in

management of human resources in Nyamira County, Kenya. The study sought to establish the influence of principals' exposure to training in ICT, to establish the principals' level of education and to determine the influence the principals' age and the influence of gender on ICT integration. The study used descriptive survey with a target population of 90 secondary school principals, 600 teachers and 30 chairpersons of board of management of secondary schools in Nyamira County. Out of whom 30 principals, 180 teachers and 30 board of management chairpersons were sampled using stratified proportionate sampling. The data collection tools were questionnaires for principals and teachers and interview schedule for board of management. The data was analyzed according to themes and objectives.

According to the research findings, majority of the teachers (52 %) do not use any form of ICT in their schools. In terms of human resource management, 77 % of the principals do not have any formal training in human resource management. Other teachers indicate that they use some forms of ICT in their schools such as laptops, desktop computers, and cellular phones among others. The majority of the principals who were respondents reported that they do not use ICT to monitor human resource. Majority of teacher respondents 74.1 % reported that they have not been through any form of ICT in-service training. Those who underwent any form of training only did it once in a year as 74.1 % of the respondents report. On the question whether teachers use ICT in recruitment and selection of human

resource, majority 55.6 % reveal that they do not use ICT in recruiting and selecting the human resource.

The study suggests strategies to put in place for expansion of ICT in these schools which include: increase the number of computers as indicated by 63% of the respondents. Training of teachers on ICT, having adequate forms of ICT and requesting the government to offer donation to public schools to facilitate ICT integration in management of human resource in public secondary schools. Further the researcher points out challenges of ICT integration in management of human resource in public secondary schools such as inadequate facilities and inadequate funds for installation as reported by 29.6 percent of the respondents, negative attitude towards ICT by the teachers, lack of trained personnel, high cost of installation and maintenance of computers and computer breakdown. Only 3.7 % of the respondents said that there are no challenges facing ICT integration in the management of human resources in public secondary schools.

On the measures that may be put in place to overcome the challenges faced in ICT integration, the respondents suggest on the use of computers more often, requested for donations to purchase ICT facilities and repair broken computers to enhance ICT integration in schools. Training teachers on ICT would enhance the integration of ICT in public secondary schools on management of human resources (Abuga, 2014). However, Despite the research methodology used, this study is limited in data analysis techniques, data collection tools and in terms of

locale of the study. The study therefore creates a knowledge gap on the integration of ICT in personnel management in public secondary schools in Kitui County.

2.2.5 ICT integration and Management of Organizational Resources

Olukunle (2008) carried out a study on the perceived effect of Information and Communication Technology (ICT) adoption in Botswana organizations. The study was carried out using a survey method. The main instrument was a personally administered questionnaire. Data was collected from a judgment sample of 29 business and public sector establishments, drawn from nine towns and cities of Botswana. The respondent in each organization was either the IT manager or the chief executive. The study notes that ICT application improved records keeping as well as information security, confidentiality, and retrieval. It also necessitated organizational restructuring, and brought flexibility and adaptability in organizational activities. The study reveals that while ICT adoption is not seen as increasing employee redundancy, it is perceived as increasing the total wage bill of the organization as well as reducing the inventory of both finished goods and input materials. As such, respondents perceived ICT adoption as beneficial to the quality of information and cost control. This study is however different from the current study in terms of the locale and the sample size hence it identifies a research gap in ICT integration and management of organizational resources in Kitui County.

A study by Mue (2014) reveals that (55.7%) of the students indicate that ICT is being used in the management of the school physical facilities. Majority of students (68.9%) indicate that it is applied either to a very great extent, greater extent or to some extent. In terms of laboratory facilities, 68.9% of the students are positive that ICT is being applied in the monitoring of laboratory facilities in the school either to a very great, great or some extent, while (33.0%) indicate that ICT isn't utilized in the monitoring of kitchen facilities. A (58.5%) of students are positive that ICT is applied in monitoring classroom facilities either to a very great, great or some extent. Slightly more than a third of the students (35.8%) indicate that they don't know the extent to which it is being applied. On the other hand, 35.9% of them are positive by indicating that it is being applied either to a great extent or to some extent. A good percentage of the students (47%) indicate that ICT application in the management of physical facilities is effective. On the contrary, 39% of them indicate otherwise.

The study concludes that public secondary schools in Lang'ata do apply ICT in the management of physical resources but to a limited extent. ICT has been limited only to the monitoring of classroom facilities, advertisement of tenders, monitoring lab facilities and stationeries (text/ exercise books). However, it has not been fully applied in monitoring facilities such as kitchen and sports facilities. This study however identifies a research gap in ICT integration in management of organizational resources in Kitui County since it is done in Nairobi County compared to this study which is carried out in Kitui County.

2.3 Principal's Personal Characteristics and ICT Integration in Management of Schools

The rapid global technological advancement and economic development in the world places a great investment into education. Nowadays, with the expansion of knowledge, advancement of technology as well as globalization issues, school management becomes a central feature and most challenging, for it requires new planning and technological adaptation to cope with technological dynamism. The school principals are the planners and managers while teachers are the implementers, and thus need to learn and apply new technologies into school management as well as classroom instructions.

2.3.1 Principal's Education Level and Training in ICT Skills

The school principal is the key to the adoption of educational reform. The principals' knowledge, skill, and philosophy determine their ICT adaptation methods. Effective implementation of educational technology requires adequate training to enable teachers confidently use and integrate ICT in professional operations (Wanjala, Khaemba & Mukwa, 2011). They further report that success of integrating ICT into school management in developed and developing countries like Kenya depend on how principals and teachers have been prepared to use computers. When properly trained, principals' ability to select, integrate and evaluate computer tools to support school management will improve. Carol (2001) reports that as schools become more equipped with ICT tools and

resources, principals will have to be able to make good use of e-mail, web browsers, data base, spreadsheets, word processors, PowerPoint software, page maker, and they must gain new and improved skills in using these technologies.

Albirini (2006) conducted a study on teachers' attitude towards Information communication technologies in Hims (the largest Syrian province). This was a descriptive study of an exploratory nature. The target population in this study was high school teachers at Hims. The total number of high school teachers was 887 (214 males, 24%; 673 females, 76%). A simple random sample of 326 subjects was selected to participate in the study. A questionnaire was used for data collection.

The study observes that pre-service principal education can play a significant role in providing opportunities for experimentation with ICT before using it in the school administration. Lack of ICT focus in initial teacher training/education is a barrier to teachers' use of ICT. Where there is no effective training on ICT and educational technology, teachers will not be able to use ICT resources for integration in management. The researcher asserts that the success of ICT integration in management activities depend on the support given by the school principal. This is due to the fact that principals who have positive mind-set and perceptions to ICT will endeavor to support the use of technology in their planning process, despite the challenges. This study however identifies a research

gap in principal's education level and ICT integration in Kitui County considering the locale of the study.

Ogachi (2015) carried out a study on factors influencing principals' integration of information communication technology in administration of public secondary schools in Isinya Sub-county, Kenya. A descriptive survey design was employed for the study. The target population of the study involved all the 12 public secondary schools in Isinya Sub-County. Simple random sampling was utilized to select a sample of 10 public secondary schools to participate in the study while the other two secondary schools were reserved for pilot study. From the sampled 10 public secondary schools in Isinya Sub-County, 10 principals, 10 deputy principals and 10 senior teachers were considered for the study. A self-designed questionnaire was utilized to collect data. The statistical package for social sciences (SPSS) was used to analyze data and the data was presented using frequency tables, pie charts and bar graphs.

The study established that most of principals were holders of Masters of Education, while most of deputy principals were holders of Bachelors of Education. However, senior teachers mostly held Bachelors of Education and Post-Graduate Diploma in Education. The implication of these findings is that the respondents had sufficient knowledge on the importance of ICT, especially the head teachers who were the main focus of this study. Information is power and as a principal furthers his or her education, the better his or her understanding

becomes in regard to the use of ICT in administrative task areas. The study further established that the ICT literacy among the principals influenced the integration of ICT in administrative task areas. This is manifested by the fact that principals who had integrated ICT in their administrative task areas were found to have participated in ICT training program. However, it was apparent that the ICT literacy among principals was mainly in financial management and least in school community relations. This meant that principals accorded greater importance to the financial aspects of administering schools as compared to the other administrative tasks. This study however used limited sample size and a different sampling procedure. The location of the study is also different hence it creates a knowledge gap on principal's characteristics and ICT integration in management of schools.

Mbatia (2014) carried out a study on factors influencing school principals' integration of ICT in administration of public secondary schools in Githunguri Sub-county, Kiambu County, Kenya. The study employed descriptive survey design and targeted a population of 32 principals, 32 deputy principals and 123 heads of departments. It was carried out in 10 public secondary schools; 10 Principals, 10 deputy principals and 40 heads of departments were randomly sampled to participate in this study. For the purposes of validating the research instrument which was the questionnaire, a pilot study was carried out in two schools outside the area under study. Reliability index of the study was reported for each questionnaire. Data was collected, coded and analyzed to form the basis of the research findings.

The findings reveal that a majority of principals have little computer literacy in Microsoft word (60 percent), PowerPoint (60 percent) and email and internet at 60 percent and Microsoft excel at 70 percent and therefore cannot effectively implement ICT integration in school administration. It is also discouraging to note that 30 percent and 20 percent of the principals were illiterate in as far as PowerPoint and email and internet respectively are concerned. Non formal interviews with these principals revealed that they depended on the school secretaries to access the internet for them. This study creates a knowledge gap on principal's characteristics and ICT integration in management of schools in Kitui County considering the local of the study.

Menjo and Boit (2005) conducted a study on challenges of using Information Communication Technology (ICT) in school management in Kenya. The study was conducted in 12 randomly selected secondary schools that had introduced computers in, Nandi North District. The study assessed the experiences of administrators and teachers in these schools. A descriptive survey research design was used where both quantitative and qualitative methodologies were employed. Data collection methods included closed and open-ended questionnaires, open-ended interviews and observation. The teachers that participated in filling the questionnaires were selected by random sampling, while all principals and computer teachers participated in the interviews. Analysis through the use of SPSS computer programme was carried out on the responses of 128 respondents who returned the questionnaires.

The findings of the study showed that ICT, as a management tool in secondary schools was not used effectively to address management issues. They further observe that 53.9% of managers attended introductory courses on computers, 33.3% on application programs and 17.5% on programs for teaching while only 21.8% attended courses for performing management tasks. Although 31% of teachers underwent either formal training or school workshops, 60% could not use computers for management activities due to inadequate training. The study is however carried out in only one sub-county compared to this study which covers the whole of Kitui County hence it identifies a research gap in the factors influencing principal's level of education and ICT training on ICT integration in management of public secondary schools in Kitui County.

Makhanu (2010) carried out a study in western province of Kenya. The study sought to establish the extent of ICT literacy among secondary school principals in the Western province of Kenya. A mixed mode methods research was conducted involving both quantitative and qualitative approaches. In this research 188 secondary school principals in the Western province were used for data collection and analysis. School principals responded to questionnaire which investigated ICT literacy while deputy principals' questionnaire investigated school performance. Open-ended questions, semi-structured interviews and observation schedules were used to obtain qualitative data. The study reveals that 73 (38.8%) principals lack training in ICT, 82 (43.6%) have informal training while 33 (33.7%) have certificate level training. The findings indicate that lack of

training in ICT could affect its use and integration in management. This study is however carried out in a different locale hence it creates a knowledge gap on principal's education level and training in ICT skills in Kitui county.

2.3.2 Principal's Gender and ICT Integration in School Management

Hoque, Razak and Zohara, (2012) carried out a study which establishes how the use of computers to facilitate school management processes has been neglected. This study involved 66 managers from 11 secondary schools in the Romp in District, Pahang, aimed at determining the level of computer usage and school administrators' attitudes toward using computers for school management. It also investigated the existence of differences in the level of computer usage among school managers based on demographic factors such as position, gender and age. Although the findings indicate a high level of computer usage for management process in schools, and positive attitudes toward using computers, there is no significant difference in computer usage levels based on gender and age.

Gender differences and the use of ICT have however been reported in several studies. Wozney, Venkatesh and Abrami (2006) reveal that male teachers use more ICT in their teaching and learning processes than their female counterparts.

Similarly, Markauskaite (2006) investigated gender differences in self-reported ICT experience and ICT literacy among first year graduate trainee teachers. Dynamic model of ICT literacy is employed. Three main components of aspiring

teachers ICT literacy are covered: (1) present general problem-solving and technical ICT capabilities; (2) situational and longitudinal sustainability; and (3) transferability of ICT capabilities into future professional domain. The study reveals significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability. Males on average worked with computers significantly for more hours per week than females. Gender also remained a significant predictor of some trainee teachers scores, related to their technical ICT capabilities.

Jamison-Proctor, Burnett, Finger and Watson (2006) did a study on teachers' integration of ICT in schools in Queensland State. Qualitative research design was used where teachers responded to interview guide. Data was analysed by use of SPSS. Results from 929 teachers indicate that female teachers integrate technology into their teaching less than the male teachers. But the situation was different in mid-western US basic schools where Breisser (2006) notes that females' self-perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged in a logo project. This confirms report by Yukselturk and Bulut (2009) that gender gap has reduced over the past years, thus a greater number of females than males use internet and web technologies. However, according to Norris, Sullivan, Poirot and Soloway (2003) gender variable is not a predictor of ICT integration into teaching. Wozney, Venkatesh and Abrami (2006) asserts that male teachers had relatively higher levels of computer attitude and ability before computer

implementation, but there is no difference between males and females regarding computer attitude and ability after the implementation of the technology. He claims that quality preparation on technology can help lessen gender inequalities.

Papaioannou and Kyriacos (2011) undertook a study on the Cyprus primary school principals' attitudes towards Information and Communication Technology (ICT) as well as their perceptions about the factors that facilitate or inhibit ICT integration in primary schools in Cyprus. A sequential mixed method approach was used to answer the research questions that guided this study. First, a survey was conducted among principals. Using a stratified random sampling 250 primary school principals from all over Cyprus (total population was 336) participated in this study. Data were collected through questionnaires. Then, a qualitative approach was followed. Eight principals were chosen to be interviewed based on specific criteria. Quantitative data were analyzed using the statistical package SPSS thereafter descriptive and inferential statistics were used to answer the research questions. The method of qualitative content analysis was used for the analysis of the qualitative data.

The findings of this study reveal that Cyprus primary school principals, generally, hold positive attitudes towards ICT. However, considerably statistically significant differences were observed across gender. It notes Cyprus male principals hold more positive attitudes towards ICT, without this meaning that female principals have negative attitudes. Statistically significant differences were

found in three subscales. More precisely, male principals are more enthusiastic about computers ($t(127) = 2.13, p < 0.05$), have less computer anxiety ($t(126) = 2.23, p < 0.05$), and believe to a lesser degree that computers have a negative impact on society ($t(127) = 2.25, p < 0.05$). This study identifies a research gap in principal's gender and ICT integration and despite the fact that the methods used are similar, this research was carried out in Kitui County.

Chepkonga, (2015) sought to find out whether there exists a relationship between the principals' gender and ICT integration in management of public secondary schools in Nairobi County, Kenya. The study adopted cross-sectional survey design where quantitative research strategy was applied for the collection of data using questionnaires. The target population comprised of 75 secondary schools. Simple Random sampling was used to select the public secondary schools with seven (10%) participating in the pilot study. Data collected by questionnaires from 68 principals were analyzed using Pearson's chi square test. The findings of the analysis of data revealed that there was no significant relationship between the principals' gender and ICT integration in management of public secondary schools in Kenya. Out of this study recommendations were made to the county government and secondary schools in Nairobi County and Kenya in general. This study is however limited in terms of locale since it is done in Nairobi County which is an urban setting and therefore it identifies a research gap on principal's gender and ICT integration in management of public secondary schools in Kitui County a rural setting.

2.3.3 Principal's Professional Experience and ICT Integration in Management of Schools

People's experience with the use of technology has been defined as the amount and type of computer skills a person acquires over time. According to Gorder (2008) teacher experience is significantly correlated to the actual use of technology hence effective use of computer is related to technological comfort levels and the liberty to shape instruction to teacher perceived student needs. National Centre for Education Statistics (2000) reports that teachers with less experience in teaching are more likely to integrate computers in their teaching than teachers with more experience in teaching.

According to the report, teachers with up to three years teaching experience report spending 48% of their time utilizing computers, teachers with teaching experience between 4 and 9 years, spend 45% of their time utilizing computers, teachers with experience between 10 and 19 years spend 47% of the time, and finally teachers with more than 20 years teaching experience utilize computers 33% of their time. The reason to this disparity may be that fresh teachers are more experienced in using the technology. New evidence from a developing nation which examined 443 teachers suggests that computer attitude is multidimensional when examining the relationship between genders, years of teaching experience, computer use, computer experience, and computer attitude (Sadik, 2006).

Granger, Morbey, Lotherington, Owston and Wideman (2002) conducted a qualitative survey on factors contributing to teachers' successful implementation of ICT in Canada. They interviewed 60 respondents from 12 schools. The findings report that there is a null relationship between teachers' teaching experience and experience in the use of ICT implying that teachers' ICT skills and successful implementation is complex and not a clear predictor of ICT integration. This study is however carried out in Canada and involved only 60 respondents compared to the current study which is done in Kitui County with a variety of respondents.

2.3.4 Principal's Age and ICT Integration in Management of Schools

Age affects teachers' perceptions of ICT and its usage on management. The younger, less experienced teachers use computers in broad micro transformation fashion and they are more likely to be ICT proficient. They have focus on educational courses on ICT and will be less constrained by prior attitudes or habit than their older more experienced colleagues (Haddad & Jurich 2005). Venkatesh and Morris (2000) carried out a study on age and gender differences in the overlooked context of individual adoption and sustained usage of technology in the workplace using the Theory of Planned Behavior (TPB). They studied on user reactions and technology usage behavior over a 5 month period among 355 workers being introduced to a new software technology application. Data was analysed using descriptive statistics and presented in frequencies and percentages.

The results show that the decisions of men and younger worker are more strongly influenced by their attitude toward using the new technology. In contrast, women and older workers are more strongly influenced by subjective norm and perceived behavioral control. The groups are found to adopt very different decision processes in evaluating new technologies.

Gode (2013) investigated the factors influencing integration of information and communication technologies in public primary teacher training colleges in central region of Kenya. The study adopted descriptive survey. The study was carried out in four (4) public primary teachers' training colleges located in the central region of Kenya with a target population of 261 academic staff. A total of 176 respondents were picked from the institutions using proportionate sampling which targeted administrators, and teacher trainers randomly chosen from each of the eight (8) academic departments, however 148 responded. Data were collected using questionnaires and interview schedules. The obtained data were analyzed systematically using descriptive statistics and presented with help of frequency table, graphs and percentages in the Statistical Package for Social Sciences (SPSS) version 17.

The results of the study indicate that out of 140 respondents, in the category of 23 teacher trainers who were aged between 31 and 40 years, 16 (69.56%) had adopted ICT in teaching while 7 (30.44%) had not adopted ICT. In the category of 84 teacher trainers who were aged between 41 and 50 years, 35 (41.67%) had adopted ICT while 49 (58.33%) had not adopted ICT. Lastly, in the category of

33 teacher trainers who were over 50 years of age, 1 (3.13%) had adopted ICT while the other 32 (96.97%) had not adopted ICT. The findings show that teachers of the ages 40 years and below had formed large proportion of teacher trainers who adopted ICT. The study therefore recommends that primary teacher training colleges should develop strategies to identify strengths and weakness of various technological resources as well as an evaluation framework. Teacher trainers should also be provided with regular trainings and seminars on how to integrate ICT in teaching and learning process and adopt policies that enhance integration of ICT in the teaching and learning process. This study however identifies a research gap in age and ICT integration in management of public secondary schools in Kitui County considering that the study is carried out in teacher training colleges and also in a different location.

Edward (2015) carried out a study on principals' characteristics influencing integration of Information and Communication Technology in management of secondary schools in Makueni Sub-County. The study adopted descriptive survey design. The target population was 43 principals, 135 Heads of Department in the 43 public secondary schools in Makueni Sub-County and one Sub-County Education Officer. Sampling was done by stratifying schools into boarding and day schools and then using simple random sampling a sample size of 28 principals, 61 HODs was obtained. The data was collected using questionnaires for principals and HODs, and interview schedule for the Sub-County Director of Education. The data was analyzed and presented using frequency distribution

tables and pie charts. The study reveals that age affects teachers' perceptions of ICT and its usage on management. Young principals have been seen to integrate ICT more compared to elderly principals a factor which has been attributed to the fact that they went through an education system that had integrated ICT. The study recommends that the Ministry of Education should construct computer laboratories and equip them with ICT tools to facilitate training of teachers and administrators in all areas of management.

Mogeni (2013) tried to establish the Influence of principals' characteristics on integration of Information Communication Technology in management of financial resources in Masaba District, Kenya. The study adopted descriptive survey design. The target population was 90 secondary principals, 600 teachers and 30 members of Board of Governor in secondary schools in Masaba District. The sample consisted of 30 principals, 180 teachers and 30 B.O.G members. Stratified sampling and simple random sampling procedures were used. The data collection tools were questionnaires for principals and teachers and interview schedule for Board of Governors. The data was analyzed according to the themes and objectives and quantitative data was entered into the computer for analyzing using the statistical package for social sciences (SPSS).

The study reveals that principal's age affected integration of ICT in schools where principals aged between 30 and 49 years showed higher percentage of ICT integration than those aged between 50 and 60 years who are heading to retire.

Teachers should change attitude towards the use and integration of ICT in the schools so as to integrate information technology in all aspects of teaching and learning institutions. This study identifies a knowledge gap considering its locale.

2.4 School Related Factors and ICT Integration in Management of Schools

Technology is virtually ubiquitous in the workplace in the developed world. Its use is measured in various studies which show, for example, that in Europe, ICT skilled employment has generally increased. In Japan, slightly more than 60% of jobs in information and research services employ people with ICT skills (World Bank, 2008).

2.4.1 ICT Infrastructure and its Integration in Management of Schools

Samuel and Zaitun (2007) researched on the adequacy of ICT resources and the right ICT Skills for teachers in integrating ICT tools in teaching and learning of English Language in Malaysian schools. A survey was conducted over a period of five months. Data was collected by use of questionnaires. The survey findings reveal that 81.7% schools have computer laboratories, 64.2% said personal computers are connected to the central server and 48.6% have computers for use. However majority of computer laboratories are inadequate in specifications and quality hence inadequate use. Richardson (2008) secondary data on ‘the state of ICT in Cambodia indicate that by 2004, only 13% of 698 secondary schools used electricity, 8% use generators while 4% use solar panels. He reports that only 6%

of lower and 35% of upper secondary schools manage to get 1-2 computers mainly for management purposes. These findings mirror the poor state of ICT infrastructure in secondary schools in Cambodia.

Katulo (2009) observes that schools in Namibia have computers without internet connectivity which hinders the use of the internet and other related services. Similarly, Swarts and Wachira (2010) report that high cost of internet connectivity and poor electricity connections in rural areas pose a challenge to ICT integration in rural areas. The report further notes that 58.9% of computers in all schools are not connected to the internet except one school where all 50 computers are connected; that schools in rural set up are unable to use ICT due to internet inaccessibility and affordability, limited rural electrification and frequent power disruptions. At the national level, Minishi-Majanja (2007) observes that affordability of ICT infrastructure could be limited by the high cost of putting infrastructure in place and is linked with the issue of poverty. At the institution level, expensive hardware and software as well as the high cost of communication and services restrict access to ICT. Most schools in Kenya do not have the means to purchase expensive computers and hardware to provide training for their staff. Affordability could be achieved through the use of open source software or cheaper versions of software which can operate on older procurement or refurbished computers, redesigning of hardware so as to lower the cost of internet access, merging internet technology to use television connection with modification and using community wireless LAN (Local Area Networks).

Kukali (2013) did a study which sought to establish opportunities available and challenges faced in use and integration of ICT in public secondary schools management in Bungoma South District, Kenya. The study employed descriptive survey design. The study population comprised of 36 Principals, 36 Deputy Principals, 36 Directors of studies and 4 District Quality Assurance and Standards Officers. Saturated sampling technique was used to select three Quality Assurance and Standards Officers, 32 principals, 32 Deputy Principals and 32 Directors of Studies. Data collection instruments were self-administered questionnaires and interviews. Quantitative data was analyzed using descriptive statistics in form of frequencies counts and percentages while qualitative data was analyzed on an ongoing process as themes and sub themes emerged. The results of the study reveals that 100% of principals, 93.8% of deputy principals and 90.6% of director of studies cite lack of adequate ICT infrastructure as a major challenge in use and integration of ICT in management. In 50% of the schools, respondents observe that there is inadequate room for ICT equipment hence congestion limiting teachers to make maximum use of computers and the internet. Most respondents report either lack of or poor internet connectivity which is a hindrance to communication and linkages through email and fax.

The school management does not make adequate use of the internet for purposes of professional and educational resource; yet such processes brings into focus best management practices such as decision making and problem solving (Kukali, 2013). However this study identifies a research gap in the influence of ICT

infrastructure and its integration in management of public secondary schools in Kitui County considering the locale of the study. Ogachi (2015) observe that the availability of infrastructure, especially computers, influenced the integration of ICT by the principals in their administrative tasks. For those principals' offices with operating computers, a fair number had reliable internet connection.

Mingaine, (2013) carried out a study on challenges in the implementation of ICT in public secondary schools in Kenya. A descriptive survey research design was adopted. Out of 350 public secondary schools in Meru County, 105 (30%) were sampled for the study. A total of 315 respondents were sampled through stratified and simple random sampling. Questionnaires were used as main instruments for data collection. Validity of the questionnaires was ensured through judgment of experts, while reliability was established through test and re-tests method during pilot study. Out of 315 questionnaires distributed, 220 (69.8%) were properly filled and returned. Data analysis employed both inferential and descriptive statistical techniques after which the results were presented in tables supported by some discussions. The results of study indicate that limited supply of qualified teachers and high cost of infrastructure are impediments to implementation of ICT. In addition to the cost of infrastructure, other costs like electricity tariffs, import duties, software licensing, transportation of imported equipments adds to the cost thus making ICT unaffordable to many schools. The study recommends that cost of infrastructure should be reduced by adopting measures such as locally assembling as well as exploiting alternative technologies to avoid reliance on

imported one. Qualified teachers with ICT skills should be employed and in-service courses design to train the ones already in the profession.

Goko (2012) carried out a study on factors affecting the use of information and communication technology in teaching and learning in secondary schools in Kangema Sub-county Murang'a County. The study adopted Non-experimental descriptive survey. The target population was 25 secondary schools. Stratified random sampling was used to select a sample of twelve schools which is 48% of the total population. Four teachers were randomly sampled in each sample school to fill the questionnaire and four principals were interviewed to represent each category of schools. Questionnaires, observation schedules and interviews were used to collect data. Piloting was done in two schools to test the reliability and validity of the research instruments. The data collected was analyzed using statistical package for social sciences (SPSS). Descriptive statistics was used to present the results of the study.

The study finding reveals that 87.5% of the schools sampled have computers in their schools while 8.3% have none and 4.2% did not respond hence referred to as non-respondents. This was evidence that most schools have some ICTs which can be used in teaching and learning. The researcher identified that 56.3% have less than five computers, 10.4% have ten to fifteen computers, 18.8% have fifteen to twenty computers while 14.6% of the total number of the schools sampled have 20 computers and above. Most of the day schools sampled falls in the 56.3%

which worsen the situation given that majority of the schools in the sub-County are day schools. The researcher further note that most of the computers in the school are found in the office represented by 47.9%, 43.8% have their computers in the computer laboratory. Only 2.1% have a computer in the staffroom while 6.3% have their computers in other places.

This implies that the teachers and the students do not easily access the computers for teaching and learning. The observation schedule reveal that most of the day schools have less than five computers most of which are used for clerical work in the school. Most of the schools do not have computers in the staffroom. This limits the teachers in use of computers to prepare their class presentation. In addition only one school had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies. The researcher recommends that the government should also intensify ICT funding in schools to help subsidize the high ICT costs and increase the number of computers in schools. This study identifies a research gap in that the research design and sample size are different from those adopted in the current study.

2.4.2 Teachers' ICT Skills and ICT Integration in School Management

A survey in US by the National Centre for Education Statistics (NCES, 2000) using the Fast Response Survey System (FRSS) reveals that 99% of full-time regular public school teachers have access to computers or the internet somewhere in their schools. The survey also wanted to establish how teachers use

computers and the internet at school and their perception of preparedness. The results show that 39% of the teachers use computers and the internet to create instructional materials, 34% use them a lot for management record keeping and less than 10% report accessing model lesson plans or research and best practice using computers or the internet. Newer teachers are more likely to use computers and the internet than those with more than 20 years' experience, who mostly use computers and the internet to communicate with colleagues.

Drent and Meelissen (2008) surveyed on the factors which stimulate or limit the innovative use of ICT by teacher educators in the Netherlands. The study used descriptive survey design. Questionnaires were used to collect data for 210 teachers and interviews for four of those teachers who had responded. Their findings show that several factors such as a student-oriented pedagogical approach, a positive ICT attitude, computer experience, and personal entrepreneurship of the teacher educator have a direct positive influence on the innovative use of ICT by the teacher. This study however identifies a research gap in teachers ICT skills in Kitui County considering the location of the study.

The degree of ICT integration in school management in developed and developing countries depend on how teachers are trained to use computers since they are backbone in any curriculum innovation (Clark, 2000). Knowledge and skills are gotten through in-service training and capacity building workshops and it helps principal to be confident in use of ICT tools in daily school management

practices. Sandholtz and Reilly (2004) explain how teachers who acquired knowledge and skills on use of computers led to increased levels of classroom implementation of computers. One teacher reported, “I was a nonuser of computers. Training on computer took major effort. Now I can use one well enough for classroom use as well as help students do essays”. “I gained a feeling of excitement and being capable. I gained a sense of accomplishment, a feeling that helped me try new ways to use technology. Consequently, teachers knowledge and skills facilitates the subsequent integration of computers in classroom instruction”, another teacher reported.

Ogachi (2015) asserts that the availability of ICT technical support significantly influences the integration of ICT by the principals in their administrative tasks areas. This implies that even though the advice on the ICT facilities to be purchased in the principals’ offices was sound, the principals were increasingly cautious on their expenditure on ICT to an extent of utilizing computer instructors rather than technicians to maintain and repair computers in their offices. The researcher concludes that the availability of technical support in the offices of the principals is key encouraging factor for the principals to incorporate ICT in their administrative functions. Technicians, who specialize in ICT infrastructure maintenance and repair, intensify the confidence of the principals in utilizing ICT in administrative tasks since an immediate solution is available to them in the event of a breakdown.

Lau and Sim (2008) argue that the ICT technical support serves as a motivation for principals to integrating ICT in administering schools. This is because a well-trained technical support team provides guidance on the use of computers, not only to the principal, but also to the teachers and students. ICT literacy is not sufficient; rather, a technical support team has to boost the confidence of the principal in employing ICT by offering guidance, over and above the technical support team's role of dealing with ICT infrastructure break downs.

Ndhine, Njoroge and Ogwel (2010) sought to establish ICT capacities and capabilities in secondary schools in Kenya in which 18 national secondary schools were purposively selected. The study employed descriptive survey design. Data collection instruments were self-administered questionnaires and interviews. Quantitative data was analyzed using descriptive statistics in form of frequency counts and percentages while qualitative data was analyzed on an ongoing process as themes and sub themes emerged. The findings reveal that 73% of teachers are ICT trained compared to 27% untrained. However, variations arose in levels of ICT training showing 57% have beginners' basic skills, 29% intermediate and only 14% have advanced basic skills. Despite the relatively high percentage of ICT literacy among degree and diploma holders (three percent) and majority being certificate holders (67%), and while the percentage of trained teachers is impressive, the study is done in national schools that are arguably established in terms of ICT requirements. This study is however limited in that it concentrated on national schools only and in terms of its locale hence it creates a knowledge gap in

teachers ICT skills and ICT integration in management of public secondary schools in Kitui County.

A study by Mwikya (2014) investigates school based factors influencing integration of information communication technology in public secondary schools, Migwani district, Kitui County, Kenya. The researcher adopted a descriptive survey to gather data. The target population of the study was all the 40 principals, 300 teachers and 2400 form 3 students. From the total population of 2400 form three students 331 students were sampled using simple random sampling. The number of teachers sampled was 100 which is over 30% of the population. All the 40 principals were sampled. The study findings reveal that integration of ICTs in the secondary schools is hindered by factors such as inadequate infrastructure, teachers have poor pre-service training in ICT because only very few have a diploma in ICT. It was observed that 70.5% of the teachers have certificate in computer application packages and 20% had a diploma in ICT while 6% did not disclose the level of ICT training. This showed that a big percentage of the teachers have the ability to use the computers although their ICT skills are not so advanced. The study was however carried out in only one district compared to this study which covers the whole of Kitui County.

2.4.3 Technical Staff and ICT Integration in Management of Schools

Minishi-Majanja (2007) reports that the problem of technical expertise is two faceted; In the first place, there are not enough people qualifying or attaining ICT

specialist skills at the speed which the technologies are adopted. Secondly, the problem of brain-drain whereby the few experts opt for better paying jobs overseas. Additionally, having technical staff available allow them to provide assistance to the school community in using software applications, when they are not engaged in servicing the technology. Whether provided by in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. The report notes that without on-site technical support, much time and money may be lost due to technical break downs. Kersaint (2007) reveals that one of the major obstacles to optimizing computer use in high schools has been the lack of timely technical support. In some extreme cases involving schools in remote areas, computers that have broken down take months to be repaired since no technician is available in the nearest town and so the computers have to be sent to the city hundreds of kilometers away. The gap exists where access of ICT technical support is limited because of inadequate technical training and fast evolution of ICTs which require regular in service technical training.

According to Albirini (2006) teachers need on-site, classroom based technical support from qualified ICT personnel/technician. The support also includes pedagogical advice on how they can choose relevant materials from the internet and sample them out for use. Technical support for teachers is limited in most schools. Where such support is available, it is not adequate. Jones (2004) reports lack of technical support as one of the major barriers that result in computers

being underutilized in the classes. Teachers do not want to use computers because they were not sure where to turn for help when something went wrong while using computers. He further argues that breakdown of a computer causes interruptions and if there is lack of technical assistance, then it is likely that the regular repairs of the computer will not be carried out resulting in teachers not using computers in teaching. The effect is that teachers will be discouraged from using computers because of fear of equipment failure since no one would give them technical support in case there is technical problem.

Yilmaz (2011) did a study in assessing the technology integration processes in the Turkish education system. In this study, survey type research model was used. In the study carried out based on the literature, short-term action plans and the evaluation reports about these plans, circulars, regulations, project documents, and research studies made on the subject matter were referred. The study reports that in providing schools with hardware and internet connections, it is also crucial to provide the schools with technical support with regard to repair and maintenance for the continued use of ICT in schools. The study further establishes that educators are often confused by technical features of using computers for the teaching-learning process. The study reports that problems such as the breakdown of ICT devices and not having enough quick support led to insufficient class time. Teachers, who do not have quick support or lack technical knowledge, encounter problems and frustrations concerning the technical management of ICT tools. It is thus hypothesized that ICT support has great impact on teachers' use of

technology as it can help boost the use of computers among educators in institutions of higher learning and this in turn can increase the likelihood of ICT integration in the teaching-learning interaction. This study identifies a research gap on technical staff and ICT integration in management of secondary schools in Kitui County considering the vicinity of the study.

2.4.4 School Type and ICT Integration in Management of Schools

In their study, Manduku, Kosgey and Sang (2006), sought to find out from the respondents if there is any significant difference in ICT adoption and use when performing management functions between day and boarding schools. The study adopted a survey research design technique. Six schools were sampled for the study. The target population included 300 head teachers, deputy head teachers, heads of departments and BOG members. Forty two respondents who represented 14 percent were sampled. Data analysis employed descriptive and inferential statistical techniques so as to infer significant relations among the research variables after which results were presented in tables.

The findings indicate that most of the day schools used both traditional and modern ICT related aspects in performing management functions but a slight difference is observed where more boarding schools seem to adopt and use modern ICT as compared to day secondary schools. The results imply that more boarding secondary schools have embraced modern ICT in the performance of management functions as compared to day schools. The study also establishes that

the level of adoption and use of ICT in Wareng District schools is limited in as far as performing management functions is concerned, as compared to performing other functions such as typing examinations and other secretarial duties. The study also establishes that there is a difference in ICT adoption and use among day and boarding secondary schools within Wareng District.

Results from this study show that boarding schools adopted and used ICT for a longer period of time than day schools. According to the study boarding schools have better facilities with modern ICT as compared to day schools. This is mainly because most of the boarding schools are well established with good infrastructural facilities and have been in existence for a longer period as compared to day schools. This brings out the glaring disparities between day and boarding schools and therefore there is need to improve the adoption and use of ICT and provision of other necessary facilities in day secondary schools in Kenya. This study identifies a research gap in influence of school type on ICT integration in Kitui County given that it is carried out in Wareng District of Uasin Gishu County while the latter is done in Kitui County.

Mwikya (2014) in his study on school based factors influencing integration of information communication technology in public secondary schools, Migwani district, Kitui County, Kenya, observed that 56.3% of schools had less than five computers, 10.4% had ten to fifteen computers, 14.6% had fifteen to twenty computers while 18.8% of the total number of the schools sampled had 20

computers and above. Most of the day schools sampled falls in the 56.3% which worsen the situation given that majority of the schools in the Sub-county are day schools. Although the schools had computers they are too few compared to the users in the schools. This not only limits the access but it also becomes difficult to rely on them in teaching and learning. The study therefore identifies a research gap in influence of school type on ICT integration in Kitui County in that although it is done in Kitui County the researcher concentrated only in one Sub-county unlike this study where the researcher considered the entire Kitui County.

2.5 Community Based Factors and ICT Integration in Management of Schools

Computers require highly skilled support and technical maintenance to operate yet most schools only budget for purchase costs. Total Cost Ownership (TCO) requires a good amount of funds to hire ICT technicians for maintenance and technical support and infrastructure development yet such funds are usually excluded from the budget. There is also the need to ensure that there is adequate security in the school premises for the safety of the expensive ICT facility hence the need to consider community factors (Bissell, 2006).

2.5.1 Community Support and ICT Integration in School Management

Richardson (2008) reports that the American Assistance for Cambodia funded internet connections to rural schools and in collaboration with Japan Relief for

Cambodia solicited funds and constructed schools, installed solar panels and internet connectivity. Cambodia now competes favorably with other developing countries in terms of ICT access and use in secondary schools. A paper by Samuel and Zaitun (2007) explores the available ICT resources and the level of IT skills of English language teachers in Malaysian schools. This paper is based on the findings of a questionnaire survey conducted over a period of five months. The paper indicates that MoE in Malaysia facilitated capacity building for administrators, teachers and other school managers from rural areas in ICT to enhance literacy levels and match the continuously introduced software and hardware in the market.

According to Hennessey, Onguko, Harrison, Ong'ondi, Namalefe's and Naseem, (2010) Partnership contribution in Benin and Uganda enabled schools acquire computers through Non-Governmental Organizations (NGOs), donor programs and projects such as Microsoft Partners in learning program, cyber school technology solutions, New Partnership in African Development (NEPAD), Uganda connect program and computer for schools program. Katulo (2009) carried out a case study in Namibia which explored the role of school principals in promoting and managing computer usage in selected schools in Namibia. The study was conducted at four schools in the Caprivi Region. The study employed a qualitative case study to collect and analyze data. A total of four school principals and four computer coordinators were interviewed, and responded to questions pertaining to the role of the school principals in promoting and managing

computer usage in selected schools in Namibia. Two focus group interviews were also conducted at two schools, to find out what they perceived to be the role of school principals in supporting and ensuring the effective use of computers in schools. The results of the study points out that the Ministry of Education (MoE) through the National Educational Technology Service and Support (NETSS) centre supported schools through free technical support services. This study however identifies a knowledge gap in community support to schools in Kitui County considering the sample size and the location of the study.

Ayere, Odera and Agak (2010) in a comparative study in Kenya reveal that through UNESCO, NEPAD and Computer for Schools Kenya (CFSK) national schools obtained computers besides training of teachers and principals at in-service level. Since there were few national schools in the country, majority of schools did not benefit from this pilot program. Farrel (2007) survey findings report that Non-Governmental Organizations (NGOs) and donors in partnership with the MoE have variously contributed computers to schools. Kukali (2013) confirms that most of the special schools in Bungoma County, Kenya, acquired computers and other school infrastructure through the MoE, Constituency Development Funds (CDF) and international donors. It is evident that despite the fact that there are several opportunities that schools could depend on for ICT use and integration in management, schools are on the contrary faced with similar magnitude of challenges as far as ICT integration is concerned.

Oloo (2009) carried out a baseline survey which covered 56 schools in seven out of the eight provinces in Kenya, in order to determine the current use and attitude towards ICTs in schools in the seven provinces. This survey employed a mix of both qualitative and quantitative techniques of data collection. Questionnaires were used to collect data from 52 public secondary schools, two primary schools and two technical training colleges. Data was analyzed using tables, graphs and charts. According to the study findings, 16.07% of schools received computers through PTA projects, 17.86% CFSK, 7% through individual donations while 54% through school funds. The above studies identify a research gap in the influence of community support on ICT integration in public secondary schools considering the fact that the studies are carried out in other regions compared to this study which is done in Kitui County.

2.5.2 School Security and ICT Integration in School Management

The security of school premises is, however, clearly an important part of ensuring the personal safety of staff, pupils and visitors (Bissell, 2006). It is therefore highly relevant to a school's overall health and safety policy. The report notes that modern schools contain many expensive items, including computers, musical instruments, TVs, video recorders and cameras. These equipment need to be protected against theft. Paying for crime means using money intended for other purposes such as maintenance, new equipment or more staff. Appropriate security measures should be taken by the school management and the community at large

to protect school property. According to Rusten and Hudson (2013), the high cost of investing in technology in public schools often can be justified partly by allowing the new computer facilities to be used by members of the school community. If this is a priority, then the community will highly support and provide the necessary security for the ICT infrastructure.

The physical security of the schools and the classrooms in which computers may be installed will highly be determined by the schools' location. Providing sufficient security in the classroom and at the school to prevent theft of equipment, software, and supplies can be expensive and it is often only possible for one or two rooms in a school (Bartlett, Akala, Semyalo & Stafford 2013). When security plans are made, it is important to achieve a balance between protecting equipment from theft and allowing easy access to computers as often as possible. Fears of being blamed for damage to or loss of equipment can cause principals and teachers to make it very difficult for students to use computers, or for community members to benefit from investments in technology through after-school use. School leadership concern over computer security can therefore be detrimental to teacher and student access. In some schools, the computers are stored and not turned on for quite a while.

Gakuu and Kidombo (2010) carried out a study on institutional management and integration of Information and Communication Technology in teaching and learning in selected Kenyan schools. Ten principals of selected schools and one

teachers' training college from Nairobi and its environs were interviewed. A mixed methods approach was used. Interviews, focus group discussions, audiotapes of discussions, videotaped classroom observations and photographs of school environments, review of school documents on ICT and teacher and student productions were used to collect data. Data was analysed by use of percentages and graphs.

The results of this study reveal that out of the ten schools studied, five schools had ICT integration and maintenance and renewal plans. The schools were also asked if they provide ICT services to the community. Only two out of ten schools did so. One mixed high school indicated they host a Cisco Centre which offers training to the school community as well as the community around the school. Another one indicated they offer typing and photocopy services to the community around the institution. Two schools said that they do not provide access to its ICT infrastructure to the community because the computers are few. Another one reported that the school does not provide any access to the community due to security reasons. According to the ICT advisor, the school has suffered several burglary attempts and therefore, the school management became hesitant to let the community use their computers. There is also fear of attacks by viruses that can render all the computers useless, this is especially serious as the school does not have internet connectivity to update anti-virus software to screen and clean the viruses. It appears, therefore, that apart from the few facilities, the fear of theft and viruses is a major reason for not sharing the computers with the community.

Kersaint (2006) argues that insecurity is one of the problems that prevent school establishments from equipping themselves with computers. The study identifies a research gap in influence of school security on ICT integration in management of public secondary schools in Kitui County on the basis of the vicinity compared to this study which is carried out in Kitui County.

2.6 Summary of Literature Review

This chapter has presented a review of literature in the area of ICT integration in management of secondary schools. The reviewed literature was obtained from journals textbooks, government documents and reports and also the internet. Reviewed literature has shown that ICT integration in many secondary schools globally is still very low (Empirica, 2006). This is despite the fact that efforts by national governments, development partners and non-governmental organizations have seen many of these schools get computers (Ayere, Odera & Agak 2010). According to Fredriksson and Gajek (2009), ICT plays a key role in the management of complex information flow and integration of such information towards effective policy formulation and planning for the utmost maximization of human capital and potential in the school environment.

A report by World Bank Report (2007), affirms that computers have made it possible for teachers to maintain accurate student records. Burdensome and tedious record keeping takes time away from more important tasks and inhibits teachers from maintaining records. Kumar, Rose and D'Silva (2008) argue that

integration of ICT helps to reduce the complexity and enhance the overall management of higher education. Maki (2008) asserts that technology can be used right from student management to various resource management in an educational institution. More so admissions can be done through web-enabled systems and all day-to-day management activities of the institution including staff management can be done by use of ICT. Uwadia (2009), Alexis (2003) and Telem (2001) all agree that ICT serves as a tool for increased productivity and effective decision making and that with introduction of ICT in the country, there are various programs that can be used to ease the burden of administration in monitoring and managing the school activities.

Manduku, Kosgey and Sang (2006) observed that on the whole, the adoption and use of ICT in Wareng schools is average with a mean of 37.214 and a standard deviation of 8.14. Mugo (2014) indicate that majority of institutions never used computer software and some always used manual method to manage data. Abuga (2014) asserts that majority of the teachers (52 %) do not use any form of ICT in their schools. Studies conducted by Albirini (2006), Ogachi (2015), Mbatia (2014), Menjo and Boit (2005), Makhanu (2010) are all in agreement that lack of training in ICT could affect its use and integration in management. Principals with higher levels of education and have ICT training integrate ICT in management of schools.

Wozney, Venkatesh and Abrami (2006), Similarly, Markauskaite (2006), Jamison-Proctor, Burnett, Finger and Watson (2006), Papaioannou and Kyriacos (2011) argue that significant differences were observed across gender. They revealed that male principals hold more positive attitudes towards ICT. However according to Breisser (2006), Yukselturk and Bulut (2009), Poirot and Soloway (2003) and Chepkonga, (2015) gender variable is not a predictor of ICT integration into teaching. They assert that there is no difference between males and females regarding computer attitude and ability. Venkatesh and Morris (2000), Gode (2013), Edward (2015) and Mogeni (2013) reveal that age affects teachers' perceptions of ICT and its usage on management. Young principals have been seen to integrate ICT more compared to elderly principals a factor which has been attributed to the fact that they went through an education system that had integrated ICT. Ogachi (2015) and Lau and Sim (2008) are in agreement that the availability of ICT technical support significantly influences the integration of ICT by the principals in their administrative tasks areas. In their study Ndhine, Njoroge and Ogwel (2010) reveal majority of teachers are ICT while Mwikya (2014) asserts that a big percentage of the teachers have the ability to use the computers although their ICT skills are not so advanced.

Studies done by Manduku, Kosgey and Sang (2006) and Mwikya (2014) observed that boarding schools adopted and used ICT for a longer period of time than day schools. This is due to the fact that boarding schools have better facilities with modern ICT as compared to day schools. Such schools are well established with

good infrastructural facilities and have been in existence for a longer period as compared to day schools. Katulo (2009), Ayere, Odera and Agak (2010), Oloo (2009), Kukali (2013) and Farrel (2007) reveal that Partnership contribution enabled schools acquire computers through Non-Governmental Organizations (NGOs), donor programs and projects such as Microsoft Partners in learning program, cyber school technology solutions, New Partnership in African Development (NEPAD), Uganda connect program, Constituency Development Funds (CDF) and computer for schools program. survey findings report that Non-Governmental Organizations (NGOs) and donors in partnership with the MoE have variously contributed computers to schools.

The security of school premises is, however, clearly an important part of ensuring the personal safety of staff, pupils and visitors (Bissell, 2006). Bartlett, Akala, Semyalo and Stafford (2013) notes that providing sufficient security in the classroom and at the school to prevent theft of equipment, software, and supplies can be expensive. Gakuu and Kidombo (2010) reports that schools do not provide any access to the community due to security reasons since some schools have suffered several burglary attempts. Kersaint (2006) also argues that insecurity is one of the problems that prevent school establishments from equipping themselves with computers.

From these research cases, it is apparent that different scholars placed different emphasis on the four major factors that influence the integration of ICT by principals in management of schools. In itself, this is a research gap that prompted an investigation to be carried, albeit in a comprehensive manner, on how these four salient factors motivate the principals to utilize ICT. Moreover these studies were based on other areas whose prevailing conditions are not similar to those in Kitui County. In fact, there is no study that has been carried out to investigate whether the factors affecting principals' ICT integration in management of public secondary schools in ASAL regions are identical to those in regions that are not classified as ASALs.

It is also important to note that methodologically this literature review revealed that descriptive survey research design has dominated research on factors influencing ICT integration in management of schools. Data analysis in most of the studies adopted descriptive statistics with only few researchers adopting limited inferential statistics. Most of the studies adopted quantitative data analysis procedure. This provided the rationale for adopting mixed methods research, Analysis of Variance (ANOVA) and multiple regression procedures in the current study. Given this, this study was necessary in a bid to fill the research gap left by prior research and therefore considered Kitui County.

2.7 Theoretical Framework

Educational researchers have developed various competing theoretical frameworks for technology integration in the school management. The researcher identified several of these theoretical frameworks that have been used to research about the integration of technology in school management. These includes; open systems theory, Technology, Organization and Environment (TOE) model, Technology Acceptance Model (TAM) and the diffusion of innovations theory.

2.7.1 Open System Theory

According to Scott (2002), open system theory was initially developed by Ludwig von Bertalanffy in reaction to earlier theories of organizations which treated the organization largely as a self-contained entity. After its development, the theory immediately became applicable in all disciplines. It is mainly formed on the concept of a system. This is whereby all bodies or organizations are systems that come into existence within the combination of various other parts whose relations make them interdependent. In other words, the concept best conceptualizes that organizations or any other system is strongly influenced by their surrounding (Bastedo, 2004).

This theory of Open systems has intensely altered how one understands a school as organizations and the demands placed upon educational leaders. In cooperation of ICT application in some of the environments that form up the school system may help in increasing the success of the school. This is in the form that the

school administration is the key player that plays a great role in maintaining and coordinating the other parts of the school system. ICT being formulated in making work easier, school administrators are able to coordinate the other parts of the school system by just a click of a button and thus they play their role effectively in organizing the other parts of the school environment (Human resource, financial resources, and educational resources among). Contemporary studies of accountability movements, teacher professionalization, and instructional leadership all benefit from a strongly open systems approach to understanding environmental demands and the resulting adaptation in school policy and its implementation, or lack thereof (Scott, 2002). This theory was used by Mue (2014) to investigate the application of information communication technology in school administration in public secondary schools in Lang'ata Division, Nairobi County, Kenya.

2.7.2 Technology, Organization and Environment (TOE) model

Technology, Organization and Environment (TOE) model was developed by Oliveira and Martins, (2011). This model emphasizes internal and external characteristics of organization as drivers for organizations adoption of technology. It includes environment context that presents both constraints and opportunities to organizations in implementation of technology. The model suggests those organization factors such as; formal and informal linking structures and communication processes within the organization determine readiness to adopt

technology. Environment factors like technology support infrastructures and government regulations will determines the speed of technology uptake by organization. Further, technology availability and cost will have effects on the way technology is implemented by organizations as shown by figure 2.1.

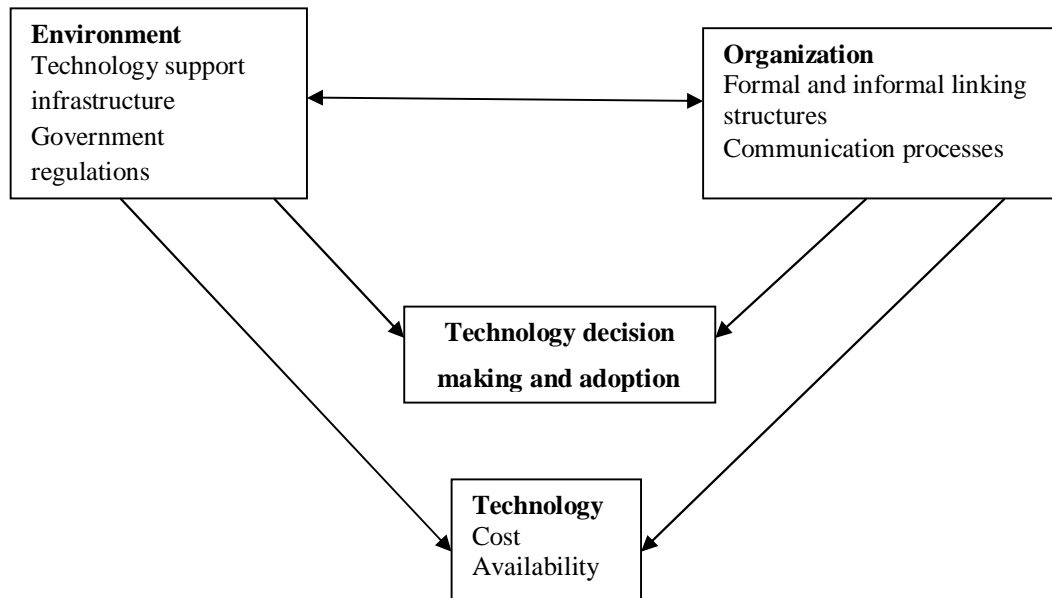


Figure 2.1: Technology, Organization and Environment model (TOE)

TOE theory was used by Mingaine (2013) in investigating the challenges in the implementation of ICT in public Secondary Schools in Kenya.

2.7.3 Technology Acceptance Model

Technology Acceptance Model (TAM) was initially proposed by Davis (1989). Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence

their decision about how and when they will use it, these factors are: Perceived usefulness (PU) - This is defined as the degree to which a person believes that using a particular system would enhance his or her job performance. Perceived ease of use (PEOU); This is the degree to which a person believes that using a particular system would be free from effort (Davis, 1989). The attitude toward adoption will decide about the adopter's positive or negative behavior in the future concerning new technology. The model is one of the most frequently employed models for research into new information technology acceptance. Many other researchers have also utilized and suggested additions for TAM theoretical framework (Venkatesh & Davis, 2000, Chuttur, 2009).

The TAM model has been used by a number of researchers in ICT integration in management of schools, for instance principals' characteristics influencing ICT in management of secondary schools (Edward, 2015) and principals' role in promoting use and integration of information and communication technology in public secondary schools (Tanui, 2013). Dishaw and Strong (1999) argued that TAM framework lack the task focus which has led to mixed findings since information and communication technology is task oriented. These researchers therefore proposed the *task-technology fit model* to address this problem.

2.7.4 Diffusion of Innovation Theory

Diffusion of Innovations Theory (DOI) is a set of generalizations regarding the typical spread of innovations and trends within a social system and therefore

explains why some innovations are adopted while others are ignored at various levels of analysis. The theory was founded by Everett Rogers in 1962 in his book, *Diffusion of Innovations*. According to Rogers (2003), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system while an innovation is an idea, process, practice or device perceived as new by an individual or social unit of adoption. Diffusion is a social process that involves and occurs through the mass media, interpersonal communications and other social networks. According to this theory, the four factors that influence the adoption of an innovation include: the innovation itself, the communication channels used to spread information about the innovation, time, and finally, the nature of the society to which it is introduced.

Kaminski (2011) categorizes adopters of innovation as: innovators, early adopters, early majority, late majority adopters and laggards. The innovators are risk-takers and pioneers in trying out the innovation. The early adopters train early and help spread the word about the innovation to others. The early majority are convinced by the innovation. The late majority wait to make sure that adoption of any innovation will only take place if it is in their best interest. The final group is the laggards. These are individuals who are highly skeptical and resist adopting innovations until it is absolutely necessary for them to do so. In many cases, the laggards never adopt the innovation.

Bateman and Snell (2004) identify five attributes of innovations that help to explain different rates of adoption. First, the innovation must have some relative advantage over an existing innovation or the status quo. Therefore, if an individual perceives that the innovation has greater advantages, then its adoption will be rapid. Secondly, the innovation has to be compatible with existing values, experiences and needs for potential users. Thirdly, the innovation must not be too complex. This is because new ideas that are easy to comprehend are adopted more rapidly than those that require new skills. Fourthly, the innovation must have trial ability for it to be tested for a limited time without adoption. Trial ability provides individuals with less uncertainty and gives them an opportunity to learn and practice by doing. Finally, the innovation must offer observable results. If an innovation shows positive results, the possibility of its adoption is enhanced.

Rogers (1975) indicates that the decision to accept an innovation is neither authoritative nor collective. Each member of a social system faces 5-stage innovation-decisions process. The first stage is called the knowledge stage. In this stage, potential adopters of an innovation must first learn the innovation and know how it functions. In the second stage, the potential users must be persuaded as to the merits of the innovation before they adopt it. Thirdly, they must make a decision to either adopt the innovation or not. The fourth stage is the implementation stage where users put the innovation into actual use. Finally the users must confirm that their decision to adopt the innovation was appropriate.

Once these stages are achieved, the diffusion of the innovation that has been introduced takes place.

Limitation of Diffusion of Innovation Theory

The diffusion of innovations theory may have left out a category of adopters who have features of innovation but may quickly not adopt it due to certain beliefs that they hold about the innovation. Additionally, the theory does not adequately provide a basis for predicting outcomes as well as providing guidance as to how to accelerate the rate of adoption, it is best applied to the socio-economic issues of ICT in the social system (Minishi-Majanja & Kiplangat, 2005). Chile (2012) affirms that the DOI theory depicts weaknesses by just classifying adopters without giving the causal explanations as to why and how people adopt different technological innovations. It is simplified to focus solely on an innovation disregarding the complex societal, cultural and economic factors while attempting to explain failed attempts of diffusion. Poor schools see little relevance for social networking and latest wireless internet.

Diffusion of Innovation Theory in Management of Schools

Studies that have examined technology adoption in management of secondary schools in light of diffusion of innovations theory are few and scattered. The diffusion research literature indicates that much effort has been spent in studying "people" differences in innovativeness, that is, in determining the characteristics

of the different adopter categories but that relatively little effort has been devoted to analyzing "innovation" differences, that is, in investigating how the properties of innovations affect their rate of adoption. This latter type of research can be of great value in predicting people's reactions to an innovation.

Bussey, Dormody and Vanleeuwen (2000) studied 310 teachers to determine the factors that would predict the adoption of technology by secondary technology education and industrial arts teachers in New Mexico. A survey questionnaire was developed to measure the factors that influenced technology adoption level. Using stepwise multiple regression procedure six explanatory variables explained 44% of variance to the level of adoption of technology. These variables included: Perceptions of the attributes of technology education as an innovation, influence of change agents and opinion leaders, perception of how often "optional" program decisions were made, perception of how often "authority" program decisions were made, teaching endorsement held, and years of teaching. The strongest predictor was teachers' perception to the attributes of technology. They suggested that for teachers to succeed in technology adoption, they needed to be provided with opportunities to raise their perceptions of compatibility, relative advantage, trialability and observability, and to lower their perceptions of complexity.

Rogers and Wallace (2011) study determined if there existed significant relationship between the level of computer anxiety, innovativeness, and the level of technology integration in pre-service teachers. Significant relationships were

found between computer anxiety, innovativeness, and technology integration. No significant differences were found between certification level and innovativeness and there were no gender differences on innovativeness or anxiety. He concluded that Rogers' theory was found to be extremely significant in predicting technology adoption. This review of the literature reveals that the diffusion of innovation theory in Secondary school management has not been sufficiently explored.

Wanjala (2013) studied on teachers' perceptions on the use of information communication technology in the administration of public secondary schools in kimilili district, Bungoma County, Kenya. The study sought to answer research questions on the perceptions of teachers regarding the level of availability of ICT facilities, the extent of use of ICT, effects of using ICT in administration and strategies that could be used to improve the use of ICT in the administration of public secondary schools. The study was guided by the Diffusion of Innovations Theory. The target population was all the twenty-five public secondary schools, 344 teachers in Kimilili District. The researcher adopted a mixed method research paradigm where cross-sectional survey and phenomenology were used. The findings of the study revealed that basic ICT hardware and software are available in most schools but they are entirely not adequate for use in performing administrative tasks. Even though the teachers were willing to fully embrace ICT in administration, its use in administration was limited to very few administrative tasks due to inadequacy of hardware or absence of relevant software. The

researcher suggested strategies on how to improve the use of ICT in the school administration and also made recommendations on issues relating to ICT infrastructure.

Rationale for using Diffusion of Innovation Theory

The rationale behind using this theory was that, Rogers' diffusion of innovations Theory was particularly useful in understanding; the technological innovation and how its attributes influenced school managers to integrate technology, the innovation-decision processes and the stages involved, the innovativeness and technological needs of different adopter categories (the early adopters and late adopters), communication channels used by individuals to share information related to technology adoption; and organization unit of the social system and how it influences technology adoption. In this study, the diffusion innovation theory shows that principals, senior teachers and assistant teachers must have knowledge of a new technology. They should be introduced to ICT resources such as computers, internet and relevant software. Technical support should equally be provided and they should be persuaded and be willing to actively participate in the implementation process by attending to various aspects of contexts (channels) within which the innovation is being used. Decision level involves training of the principals and teachers; this will lead to acquisition of skills and development of different attitudes towards the innovation hence positive perception towards the use of the innovation. During the implementation process, principals, senior

teachers and assistant teachers reflect on the advantage and effectiveness of integrating ICT in management of schools and as a result express their readiness towards ICT integration.

In this study, the attributes that affect diffusion of an innovation as identified by Bateman and Snell (2004) were applied. The attributes in the theory provide an outline that helps in understanding why some principals integrate ICT in the performance of their management tasks while others do not. The diffusion theory can be used to explain, visualize and account for factors that enhance or hinder the integration of ICT in the management of secondary schools. Diffusion of innovations theory also helps education policy developers to identify qualities that will make the integration of ICT in management of schools more appealing to prospective users. According to Rodgers (2003) the communication channels used to spread word about adoption of any innovation and the nature of the society determines the rate of adoption of a new technology. In schools this can be achieved through training or ICT literacy upgrading courses, policy statements and circulars from the Ministry of Education.

The theory was found appropriate for this study because it brings out perceptions and factors that influence the integration of ICT in the management of secondary schools. The factors include: (1) principal related factors which include age, gender, professional experience and level of education. (2) School related factors which include ICT infrastructure, teachers ICT skills, school type and availability

of ICT technicians (3) Community related factors which include community support and school security. According to this theory, principals need to be persuaded through sensitization about the new innovation before adopting it for use in management. The theory further explains that some teachers are slow in taking up the new technology and applying it because they wait to see how others have benefited from it before accepting it. Others have already adopted the technology and are enjoying the benefits. This can be explained by the different categories of adopters according to this theory. The theory provides an understanding of how to introduce new ideas into the social system and sustain them. The theory was therefore used to examine the factors influencing ICT integration in management of public secondary schools in Kitui County, Kenya.

2.8 Conceptual Framework

The conceptual framework for the study forms the basis for the research and provides conceptual tools to critically analyze and promote better approaches to the given variables. Principals as the school managers will determine the level of ICT integration in management of schools. This study considered the following variables that influence ICT integration in management of schools: Principal related factors, school related factors and community related factors. The independent variables have been conceptualized to the factors that affect adoption of innovation according to Rogers (2003) as indicated in figure 2.2 below;

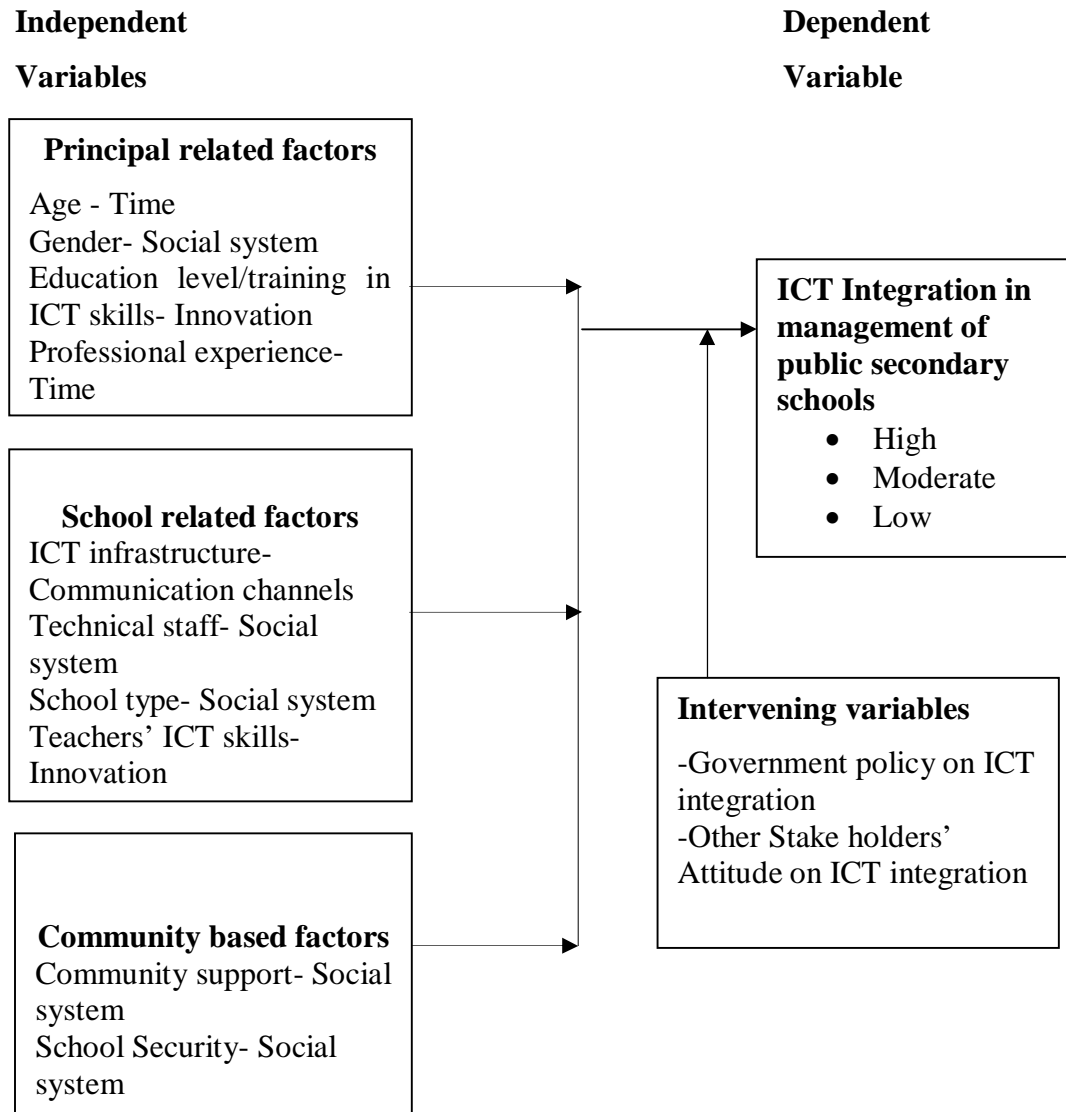


Figure 2.2 Conceptual framework explaining factors influencing ICT integration in management of public secondary schools.

The factors influencing ICT integration form the independent variables. ICT integration in management of public secondary schools is the dependent variable. The independent variables will directly influence ICT integration in management

of public secondary schools in that there will be either high or low levels of ICT integration in management of public secondary schools. The intervening variables include government policy and other stakeholders' attitude. Government policy on ICT integration in general can affect ICT integration, such that if there is no policy framework, then the integration becomes an option all efforts notwithstanding. Stakeholders' attitude to ICT integration will also affect ICT integration.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in the study. It consists of the research design, target population, sample size and sampling procedures, research instruments, validity and reliability of research instruments, data collection procedures, data analysis techniques and ethical considerations.

3.2 Research Design

This study adopted descriptive survey research design. According to Mugenda (2011) survey research design is useful not only in securing evidence concerning an existing situation or current conditions but also identifies standards or norms with which to compare present conditions in order to plan the next step. This study aimed at studying conditions or events that have already occurred and do exist. Descriptive survey design was therefore suitable for this study. The design is also useful in describing the characteristics of a large population, makes use of large samples, thus making the results statistically significant even when analyzing multiple variables, many questions can be asked about a given topic giving considerable flexibility to the analysis, the design allows use of various methods of data collection like questionnaire and interview methods and it also makes use of standardized questions where reliability of the items is determined.

According to Cohen et al (1994), descriptive survey designs are used in preliminary or exploratory studies to allow researchers to gather information, summarize, present and interpret for the purpose of clarification. This descriptive survey design was suitable in determining reasons or causes for the current status under study. It was chosen because it was the best method available to social scientists and those who are interested in collecting original data for the purpose of describing a population which is too large to observe directly. It was therefore appropriate in collecting data regarding opinions, perceptions and experiences of principals, senior teachers, assistant teachers, county Directors and Sub-county Directors of Education. The study adopted the descriptive survey design since it would be suitable in investigating the factors that influence the integration of ICT in management of public secondary schools.

In this research mixed approach method was used that is qualitative and quantitative data was collected. According to Kothari (2011), qualitative methods provide greater depth of understanding about a limited number of subjects, while as quantitative methods give a less in-depth understanding, but cover a wider scope of subjects. In addition, qualitative approaches do not capture trends and patterns across the study population and also do not enable generalization to the whole population. On the other hand, with quantitative approaches it is difficult to quantify feelings or perceptions of respondents and also may lead to researcher bias as the questions asked could be leading to the research participants.

Using mixed approach gives a more powerful research (Guba & Lincoln, (2005). Therefore, a complementary mixture of quantitative and qualitative data was sought in the methods used where the strengths of each approach was fully utilized. Mixed methods take on the good aspects of both the positivists and the anti-positivists world views. According to (Creswell, 2009) pragmatism draws from both world views whereby the researcher is not committed to one system, it gives the researcher freedom of choice that is to choose methods, procedures and tools that suit specific needs and views truth as what matters at that time, for example, what one thinks about technology can change over time and therefore will accordingly affect their use of technology. The study aimed at collecting opinions from the principals, senior teachers, and assistant teachers, County Directors and Sub- county Directors of Education about the factors influencing integration of ICT in management of public secondary schools in Kitui County. The secondary data was collected from literature review from the internet, journals and relevant books while questionnaires and interview schedules enabled the researcher collect the primary data.

3.3 Target Population

The total population that the researcher specifies in research is referred to as the target population (Mugenda, 2011). Using EMIS data obtained at Kitui County Education office, 58 public secondary schools which have the most functional ICTs were selected for the study. The study targeted only schools which have

functional ICTs (Kitui County Education office, August, 2015). The target population for this study was the 58 public secondary schools principals, 58 senior teachers, 870 teachers, 16 Sub-county Directors of Education in the 16 Sub-counties and one County Director of Education in Kitui County. The County Director and Sub-county Directors of Education were targeted because they bear the responsibility of carrying out management tasks of their County and Sub-counties respectively while the principals are the managers of their schools and carry out the allocation of ICT resources in the schools. Teachers are implementers as well as users of ICT. Teachers also execute duties related to management as delegated to them by principals.

3.4 Sample Size and Sampling Procedure

A sample is a proportion of a population selected for observation and analysis (Ogula, 2005). This proportion is carefully selected to be a representative of the whole population with the relevant characteristics. Each member or case in the sample is referred to as subject, respondent or interviewees. This study used census sampling of all the principals in the 58 public secondary schools with functional ICT infrastructure in Kitui County. One senior teacher was also selected from each of the 58 schools. All the 16 Sub-county Directors of Education and the County Director of Education were sampled for the study. The sample for the teachers was arrived at by use of sample size table as proposed by Krejcie and Morgan (1970) whereby random sampling was used. This table was

also referred to by Peter (2005) as a useful table for determining sample size. As shown in Appendix VII, for small populations the sample size is proportionally large, but as the population size gets larger, the sample gets proportionally smaller. This table was adopted as a guide for deciding the sample size for teachers in this study. Since the population size of the teachers is 870, the corresponding sample size for this population was therefore 266 teachers. The sample size for this study was therefore 58 principals, 58 senior teachers, 266 assistant teachers, 16 Sub-county Directors of Education and one County Director of Education. The sample size is as presented in table 3.1 below;

Table 3.1: Sample size

Respondents	Target population	Sample population
Principals	58	58
Senior teachers	58	58
Teachers	870	266
Sub-county Directors of Education	16	16
County Director of Education	1	1
Total	1003	399

3.5 Data Collection Instruments

The purpose of a tool or instrument in research is to measure the variables of the study (Mugenda, 2011). This study used questionnaires and interview schedule as tools for data collection. The questionnaires were administered to principals and teachers while interview schedules were administered to the Sub-county Directors of Education and the County Director of Education.

3.5.1 Questionnaires

Questionnaires were used simply because they can reach a large number of respondents within a short time, it gives the respondents adequate time to respond to the items, offers a sense of security and confidentiality to the respondents and lastly it tends to be objective since there is no bias resulting from the personal characteristics (Ogula, 2005). The questionnaires were divided into various sections based on the research objectives. Section I of the entire questionnaire dealt with demographic characteristics. Section II covered the extent to which ICT has been integrated in management of public secondary schools, section III dealt with the influence of principal's related factors in the integration of ICT in management of public secondary schools, section IV dealt with the influence of school related factors in the integration of ICT in management of public secondary schools and section V covered the influence of community related factors in integration of ICT in management of public secondary schools.

3.5.2 Interview Schedule

The Interview schedule was used to collect data from the Sub-county Directors of Education and the County Director of Education. An interview as a method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses (Kothari, 2011). Interview method provides in depth and qualitative data as it presents opportunity to explain the purpose of study. This instrument was considered appropriate in this study because it enables the researcher to yield highest cooperation and lowest refusal rates; it offers high response quality, takes advantage of interviewer presence and its multi-method data collection (Kothari, 2011). The guide comprised of both closed and open ended questions.

3.6 Piloting

Pilot testing is a preliminary survey (Kothari, 2011) and was carried out by administering questionnaires to four principals, four senior teachers and four assistant teachers from four selected schools in the neighboring Machakos County. Participants in the pilot test were chosen because according to Mugenda (2011) though they did not participate in the study, they were similar to the intended participants and were considered thoughtful and critical. The pilot test participants were from various categories such as boys boarding, girls boarding, mixed boarding and mixed day schools. The participants were encouraged to

make comments and suggestions which were used to improve the items such as re-wording in the questionnaire and interview guides.

Pilot testing was conducted in order to detect any deficiencies and difficulties that respondents are likely to face when responding to the items. The purpose was to establish if any questions made respondents feel uncomfortable and to make sure that all the participants in the sample understood the questions in the same way. Moreover, the researcher was able to find out how long it would take to complete the survey hence regulate it. The findings of the pilot study were used to determine the validity of the research instruments.

3.6.1 Validity

Validity is the degree to which results obtained and data analyzed represent the phenomenon under investigation (Orodho, 2009). A research instrument is valid depending on how the data collected in terms of how effective the items have sampled significant aspects of the purpose of the study, research instrument should provide adequate coverage of the topic. Content validity of the research instrument can be enhanced through expert judgment (Best & Kahn, 2011). The researcher prepared the instrument in consultation with the research supervisors to ensure that the specific areas or objectives were covered by the instruments. Expert judgment enabled the researcher to identify areas of weakness of the instruments and made the appropriate corrections which were incorporated in the instruments to increase its validity. Instrument validity was established by pre-

testing of data collection tools by a pilot study. The instruments were administered to four types of respondents from four types of public secondary schools in the neighboring Machakos County. These schools had the same social and economic environment with the ones under study. The instruments were modified as follows: in appendix II, section IV item 12 which was a question with yes and no answers was changed to “how many computers do you have in your school” this helped to indicate the real number of computers in schools.

3.6.2 Reliability

The term reliability points to the level of internal consistency or stability over time of a research instrument. A measuring instrument is reliable if it provides consistent results (Kothari, 2011). Therefore, for a research instrument to be reliable; it must be capable of yielding consistent results when used more than once to collect data from two samples drawn randomly from the same population. Test- retest method was used to test the reliability of research instruments. To establish the reliability of the research instruments, the researcher carried out a test – retest study in four schools in the neighboring Machakos County. The schools were categorized as boys boarding, girls boarding, mixed boarding and mixed day school hence the schools had the same social and economic environment with those under study. From each school the principal, senior teacher and an assistant teacher were selected. Instrument reliability was determined through test- retest method. The Pearson’s Product- Moment correlation(r) formula:

$$r_{xy} = \frac{\sum x_i y_i - n \bar{x} \bar{y}}{(n-1) s_x s_y} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n \sum x_i^2 - (\sum x_i)^2} \sqrt{n \sum y_i^2 - (\sum y_i)^2}}.$$

was used to correlate the pre-test and post- test results in order to determine the coefficient of reliability or stability according to (Best & Kahn, 2001, Mugenda, 2011). From the computation, the correlation for principals, senior teachers and assistant teachers was 0.87, 0.82 and 0.81 respectively, and this was deemed reliable according to Gay (2005).

3.7 Data Collection Procedures

The researcher secured an introductory letter from the Board of Post graduate Studies, South Eastern Kenya University to act as an identity and obtained a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). The researcher sought authority to collect data from the County Commissioner and County Director of Education respectively. The researcher then made appointment with the principals of the sampled secondary schools. The researcher gave the introduction letter to the school principals and explained the purpose of the study. The principals then introduced the researcher to their senior teachers. After establishing a rapport, the researcher administered the research instruments personally. The researcher gave adequate time to respondents to fill the questionnaires and then collected them. The researcher made prior arrangements with the County Director of Education and the Sub-county Directors of Education to visit them at their respective places of work and

administered the in-depth interview schedule to them at their convenient time through face to face conversation.

3.8 Data Analysis Procedures

According to Orodho (2008), data analysis involves carrying out some type of grouping of data collected, thereafter placing the data in common categories and computing a number or a percentage of each division. Once the data was collected from the field, it was sorted to identify errors made by the respondents such as spelling and any non-response to items. The data was then coded and keyed into Statistical Package for Social Sciences (SPSS). Qualitative data generated from the open ended items in the research instruments were organized into themes and patterns based on the study objectives and questions. Data was also analyzed using mixed model method which included both descriptive and inferential statistics. The descriptive statistics used was frequency tabulation and the mean while inferential statistics used were the Pearson correlation coefficient test, Pearson Chi-square test, Multiple regression and ANOVA, all at 0.05 level of significance. The researcher then discussed the findings, made conclusions and recommendations for the study and suggestions for further research. Data analysis was as demonstrated in tables 3.2 and 3.3 below.

Table 3.2: Data Analysis Matrix: Research Question

Research Question	Dependent Variable	Data type	Statistical tool	Reason (Goal for analysis)
To what extent has ICT been integrated in management of public secondary schools?	ICT integration	Interval	Percent Mean	Level of integration

Table 3.3: Data analysis matrix: Hypotheses testing

Hypothesis	Independent Variable	Data type	Dependent Variable	Data type	Statistical Tool	Reason (Goal for analysis)
H ₀₁	Age	Ratio	ICT Integration	Interval	Pearson's product moment of correlation coefficient	Tests for the strength of relationship between two variables.
H ₀₂	Gender	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for the strength of association between two variables.
H ₀₃	Level of education	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for the strength of association between two variables..
H ₀₄	Professional experience	Ratio	ICT integration	Interval	Pearson product moment of correlation coefficient.	Tests for the strength of relationship between two variables.
H ₀₅	School type	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for strength of association between two variables
H ₀₆	Infrastructure	Ratio	ICT integration	Interval	Pearson product moment of correlation coefficient	Tests for the strength of relationship between two variables
H ₀₇	Technical Support	Ratio	ICT integration	Interval	Pearson product moment of correlation coefficient	Tests for the strength of relationship between two variables
H ₀₈	ICT skills	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for strength of association between two variables
H ₀₉	School security	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for the strength of association between two variables
H ₀₁₀	Community Support	Nominal	ICT integration	Interval	Chi-square test for independence	Tests for the strength of association between two variables

3.9 Ethical Considerations

According to Mugenda (2011), ethics in research focus on the application of ethical standards in the planning of the study, data analysis, dissemination and use of the results. This means that the study addresses logistical, ethical and human relations issues to ensure successful completion of a research project (Orodho, 2009). The researcher ensured that all ethical concerns were addressed.

3.9.1 Confidentiality and Privacy

In this study, the confidentiality of the research participants was ensured. This was done by ensuring that the principles governing research participants were followed. Great care was taken to assure respondents that all information was treated with a lot of confidentiality. The researcher informed the respondents that no information was shared to third party. Also their information was not identified and was used for research purposes only.

3.9.2 Anonymity

The researcher assured the respondent that his or her individual identity would not be revealed whatsoever. Besides, no identity information about the individual respondents or the institution would be revealed in written form.

3.9.3 Informed Consent and Voluntary Participation

To ensure that there is informed consent and voluntary participation of the respondents who participated in the study, permission to conduct the research from respondents was sought from the secondary school principals. Each respondent was served with a copy of the introduction letter informing them about the nature, purpose and importance of the research and the procedures involved during the data collection so that they could participate willingly.

3.9.4. Plagiarism

Plagiarism is the practice of taking someone else's work or ideas and passing them on as one's own. It means to use another person's production without crediting the source. In this study all ideas, processes, results, or words that were used from other authors were properly acknowledged and credited.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter consists of data analysis, interpretation, presentation and discussion of research findings. The purpose of this study was to investigate factors influencing ICT integration in the management of public secondary schools in Kitui County, Kenya. The study utilized both descriptive and inferential statistics. The analysis was based on findings from four research objectives.

4.2 Questionnaire Return Rate

According to Mugenda and Mugenda (2003), questionnaire return rate refers to the number of respondents who returned usable instruments for the study out of the total number contacted for study. The questionnaires for this study were administered to 58 principals 58 senior teachers and 266 assistant teachers. The interview guide was used to collect data from 16 Sub-county Directors of Education and one County Director of Education. The data was analyzed on the basis of these questionnaires and interview guides. The results of questionnaire return rate are as shown in Table 4.1.

Table 4.1: Questionnaires Return Rate

Respondents	Returned	Not Returned	Total
Principals	50(86%)	8(14%)	58(100%)
Senior teachers	50(86%)	8(14%)	58(100%)
Assistant Teachers	250(94%)	16(6%)	266(100%)

The questionnaires return rate as presented in Table 4.1 became possible because the researcher personally took the questionnaires to the sampled public secondary schools in Kitui County and a time frame of two weeks was given to the respondents to fill the questionnaires. Mugenda and Mugenda (2003) observe that a 50 percent response rate is adequate for analysis and reporting. A response rate of 60 percent is good and a response rate of 70 percent and over is very good. The response rate for this study was therefore very good since it was over 70 percent. This would provide the required information for purposes of data analysis hence this could enhance sample representation and meaningful generalization.

4.3 Demographic Information for the Respondents

The respondents were requested in the questionnaires to indicate their demographic characteristics which included; gender, age, highest academic qualifications and their working experience.

4.3.1 Distribution of Respondents by Gender

The information on gender distribution helped the researcher to ascertain the real representation in the study in terms of the gender. The results on gender were shown in Table 4.2.

Table 4.2: Gender Distribution of Respondents

Gender	Principals		Senior teachers		Teachers	
	Frequency	%	Frequency	%	Frequency	%
Male	30	60.0	28	56.0	170	68.0
Female	20	40.0	22	44.0	80	32.0
Total	50	100.0	50	100.0	250	100

Table 4.2 shows that in general there were more male respondents than their female counterparts. The researcher noted that this was due to the fact that there were more male respondents compared to the other gender in the entire target population. This was because most schools studied were boys and mixed schools which were most headed by male principals. This gender distribution was likely to give a good representation in terms of gender as it followed a two thirds majority rule of either gender. This agrees with Wozney, Venkatesh and Abrami (2006) who argue that gender differences influences the use of ICT and that male

teachers use ICT more in their teaching and learning processes than their female counterparts.

4.3.2 Distribution of Respondents by Age

The respondents were requested to indicate their age. The age characteristic is likely to show the physical maturity rate of a principal or a senior teacher and the results are shown in table 4.3.

Table 4.3: Distribution of Respondents Age

	Principal		Senior master		Teachers	
Age in years	Frequency	%	Frequency	%	Frequency	%
Below 30	0	0	5	10	80	32.0
30 – 40	6	12.0	25	50	100	40.0
41-50	32	64.0	15	30	50	20.0
51-60	12	24.0	5	10	20	8.0
Total	50	100.0	50	100.0	250	100

Table 4.3 shows that as people advance in age they are given leadership positions owing to experience gained as they advance in age hence the promotion as principals and senior teachers. However, the senior teachers seemed to decrease as they advance in age as most of them seem to be appointed as deputy principals

and consequently principals. These results implied that age would be a pointer to the use of ICT as argued by Edward (2015). The researcher notes that age affects teachers' perceptions of ICT and its usage on management.

4.3.3 Distribution of Respondents by Academic Qualification

Academic qualification of Principals determines the professional development of a teacher. In Kenya Principals are not just handpicked to head secondary schools, but there is more emphasis on the professional qualification of teachers in such appointments to a reasonable level. The principals were required to indicate their highest academic qualification. The results were as shown in Table 4.4

Table 4.4: Academic qualification of respondents

	Principals		Senior teachers		Teachers	
	Frequency	%	Frequency	%	Frequency	%
Diploma	3	6.0	6	12.0	40	16.0
Degree	29	58.0	32	64.0	200	80.0
Masters	18	36.0	12	24.0	10	4.0
PhD	0	0.0	0	0.0	0	0.0
Total	50	100.0	50	100.0	250	100.0

Table 4.4 shows that in Kitui County there were more Principals with masters degrees compared to senior teachers and assistant teachers. This means that a good number of the principals had passed through a system of education where different communication channels about the use of ICT have been employed hence they were aware of technological changes in the educational sector. According to Rogers (2003) communication channels used to spread word about an innovation determines its rate of adoption. This was likely to influence the ICT integration as argued by Wanjala, Khaemba and Mukwa (2011) who argue that the principals' knowledge, skill, and philosophy determine their ICT integration methods.

4.3.4 Distribution of Respondents by Professional Experience

The experience of teachers is a pointer to quality leadership and management including student's behavior. This experience is usually determined by the number of years worked. The respondents were requested to indicate their experience. The results are presented in Table 4.5.

Table 4.5: Professional Experience of Respondents

	Principals		Senior teachers		Teachers	
Experience	Frequency	%	Frequency	%	Frequency	%
Less than 5 years	0	0.0	0	0.0	70	28.0
5 -9	2	4.0	19	38.0	90	36.0
10 - 15	21	42.0	25	50.0	50	20.0
More than 15	27	54.0	6	12.0	40	16.0
Total	50	100.0	50	100.0	250	100

Table 4.5 shows that teachers became principals with experience while the less experienced seemed to play their role just as assistant teachers.

4.3.5 Distribution of Schools by Type

The researcher sought to determine the type of schools covered by this study. This refers to whether the school is boys boarding, girls boarding, mixed boarding and mixed day. Since the research covered the same schools for principals, senior teachers and assistant teachers, the responses were the same so only data for the principals was reported. Since the respondents were drawn from the four categories of schools, it shows that schools with individual characteristics were represented. These characteristics according to Rogers (2003), are important because they determine who adopts the innovation and when. The responses were presented in Table 4.6.

Table 4.6: Distribution of school by type

Frequency	Frequency	Percent
Boys Boarding	18	36.0
Girls boarding	20	40.0
Mixed boarding	10	20.0
Mixed day	2	4.0
Total	50	100.0

Table 4.6 shows that the boarding schools were slightly more than the other schools. This implies that most boarding schools had integrated ICT in management as opposed to day schools. This might be the issue of numbers and the amount of money allocated to the boarding schools which enables them to purchase ICT infrastructure.

4.4 ICT Integration and Management of Public Secondary Schools

The first objective for this study sought to determine the extent to which ICT has been integrated in the management of public secondary schools in Kitui County, Kenya. The principals were required to indicate their opinion on school type with the highest level of ICT integration. The responses were presented in Table 4.7.

Table 4.7: School Type and Integration of ICT

Frequency	Frequency	Percent
Boys Boarding	23	46.0
Girls boarding	15	30.0
Mixed boarding	7	14.0
Mixed day	5	10.0
Total	50	100.0

Table 4.7 shows that majority (46%) of the principals indicated that boys boarding schools had the highest level of ICT integration compared to other school types. This was followed by girls boarding with 30% responses. The least were the mixed boarding (14%) and mixed day (10%) respectively. These results implies that the boarding schools were integrating ICT in their administration to a great extent compare to day schools. This shows that the school type was influencing the ICT integration.

Table 4.8: Frequency of use of ICT in school management

ICT use	Principals		Senior teachers		Teachers	
	Frequency	%	Frequency	%	Frequency	%
Every day	5	10.0	18	36.0	87	34.8
Twice per week	39	78.0	30	60.0	148	59.2
Once per month	6	12.0	2	4.0	15	6.0
Total	50	100.0	50	100.0	250	100

Table 4.8, revealed that at least the principals and senior masters were using ICT in the management of schools though not every day. This shows that ICT integration was minimal in most schools. These results agree with those of Balanskat, (2006) who notes that the growth in the ICT application in schools is minimal leading to differences in e-maturity though Countries have continued to invest huge amounts of money in ICT in schools. Studies in UK reveal that only 10 to 15 percent of schools are e-mature (Balanskat, 2006). The same case applies to Kitui County where 12% of the principals indicated that they used ICT in management of schools once per month with only 10% stating that they use ICT on daily basis. This is also in consonance with Abuga (2014) who observes that majority of teachers did not use any form of ICT in their schools. The study also notes that majority of the principals report that they did not use ICT to recruit, select and monitor human resource.

The principals were further required to indicate the extent to which they had integrated ICT in the management of school records by indicating; 1 – Great extent, 2- some extent. 3 – Undecided, 4 – less extent and 5-No extent on the given resources. The results are presented in Table 4.9.

Table 4.9: Extent of ICT integration in the management of school records

ICT Integration	1		2		3		4		5		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Accounting	6	12.0	10	20.0	28	56.0	4	8.0	2	4.0	50	100
Personnel management	5	10.0	12	24.0	19	38.0	9	18.0	5	10.0	50	100
Students registration records	12	24.0	20	40.0	10	20.0	7	14.0	1	2.0	50	100
Timetabling	18	36.0	15	30.0	12	24.0	5	10.0	0	0.0	50	100
Internal exams	35	70.0	10	20.0	5	10.0	0	0.0	0	0.0	50	100
Record of physical materials	10	20.0	16	32.0	20	40.0	4	8.0	0	0.0	50	100
Library records	4	8.0	7	14.0	10	20.0	25	50.0	4	8.0	50	100

Table 4.9 shows that majority of the principals used ICT for internal exams to a great extent. This was followed by the principals who used ICT for accounting

purposes to less extent. According to the results some principals used ICT for students' registration records to some extent. Some principals also reported use of ICT in recording physical materials to some extent while other reported using ICT in library records to some extent. This may be attributed to the fact that principals are certain that ICT integration in management enhances job satisfaction. This can be supported by Rogers (2003) who argues that innovation must have some relative advantage for it to be adopted.

The results of this study concur with those of Manduku, Kosgey & Sang (2006) who confirm that ICT is mostly used for record storage purposes, timetabling, communication and secretarial work such as typing examinations and staff meeting minutes in that order. Analysis of both academic results and financial accounting, use of internet and power point presentations recorded very low ratings. World Bank Report (2007), indicate that computers have made it possible for teachers to maintain accurate student records, track and analyze performance and use the resulting information to make decisions about how to individualize instruction. These results are in agreement with Bateman and Snell (2004) who identify five attributes of innovations that help to explain different rates of adoption. The first attribute states that the innovation must have some relative advantage over an existing innovation or the status quo. Therefore, if an individual perceives that the innovation has greater advantages, then its adoption will be rapid.

Further the senior teachers were requested to indicate the extent to which ICT has been integrated in the management of the following physical resources in their school, using a scale of 1 – Great Extend, 2- Some Extend, 3 – Undecided, 4 Less Extend, 5-No extent. The responses were presented in Table 4.10.

Table 4.10: Senior Teachers Responses on Extent to which ICT is used in the Management of Physical Resources

Resource	1		2		3		4		5		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Books	22	44.0	12	24.0	5	10.0	6	12.0	5	10.0	50	100
(Text/Exercise)												
Classroom facilities	10	20.0	12	24.0	6	12.0	10	20.0	12	24.0	50	100
Lab facilities	18	36.0	12	24.0	4	8.0	10	20.0	6	12.0	50	100
Kitchen facilities	5	10.0	9	18.0	15	30.0	11	22.0	10	20.0	50	100
Sports facilities	4	8.0	6	12.0	12	24.0	18	36.0	10	20.0	50	100

Table 4.10 shows that, majority of the senior teachers indicated that ICT was used in the management of records for text books and exercise to a great extent compared to the other facilities. This was followed by the laboratory facilities. However, it was observed that the ICT was rarely used in management of classroom and kitchen facilities.

The senior teachers and assistant teachers were requested to indicate the extent to which their school management uses ICT using a scale of; 1- Great Extent, 2- Some Extent, 3- Undecided, 4 - less Extent. 5- No extent. The responses were presented in Table 4.11.

Table 4.11: Use of ICT in school

ICT use	1		2		3		4		5		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Communication with teachers	25	50	15	30.0	3	6.0	5	10.0	2	4.0	50	100
Keeping teachers records	6	12	6	12	2	4	15	30	31	62	50	100
Communication with parents	20	40.0	11	22	9	18.0	5	10.0	5	10.0	50	100
Timetabling	26	52	20	40.0	2	2.0	2	2.2	0	0.0	50	100
Internal exams	33	66.0	14	28.0	2	4.0	1	2.0	0	0.0	50	100

Table 4.11 reveals that, majority (66.0%) of the respondents reported that ICT was used to a great extent in internal examination. This was followed by 52% who indicated that to a great extent ICT was used in timetabling. Other uses included; communication with parents and teachers with 40% and 50% respectively. The results can be attributed to the fact that respondents viewed ICT

integration in management as a tool that make them perform their management tasks with ease. According to Bateman and Snell (2004) for an innovation to be adopted it must have some relative advantage over an existing innovation or the status quo.

These results are in agreement with those of Mue (2011) who observes that public secondary schools in Lang'ata do apply ICT in the management of physical resources but to a limited extent. ICT has been limited only to the monitoring of classroom facilities, advertisement of tenders, monitoring lab facilities and stationeries (text/ exercise books). However, it has not been fully applied in monitoring facilities such as kitchen and sports facilities. On internet use, the principals and senior teachers were requested to indicate how often they used internet. The responses were presented in Table 4.12.

Table 4.12: Principals' and senior teachers' responses on internet use

Internet use	Principals		Senior teachers	
	Frequency	%	Frequency	%
Every day	12	24.0	10	20.0
Some time	29	58.0	32	64.0
Never	9	18.0	8	16.0
Total	50	100.0	50	100

Table 4.12, shows that majority (58%) of principals and 64% of senior teachers used internet less frequently. Those who used internet on daily basis were 24% for the principals and 20% for the senior teachers. It was also noted that some principals (18%) and 16% senior teachers had never used internet.

These results were corroborated by those of both the County Director and Sub-County Directors of Education who had both served for more than three years in the county. In an interview with the researcher, they both reported that some schools were indeed using ICT in the management of their schools. They also reported that the principals used ICT in communication to teachers, parents and suppliers.

These results map with those of Kenya School Net (2008). The report found out that out of 69 schools which were sampled only 46 per cent of schools had computers, with availability of internet. The report also indicate that email was yet to be recognized as a tool for collaboration among students and teachers, and

only one school had a website while another two reported having networked all their computers to the internet. It went on to affirm that in these schools, access to the internet was severely limited and when available was only for administrative use. This is also in agreement with Katulo (2014) who found out that schools in Namibia had computers with no internet connectivity which hinder use of the internet and email. Similarly, Swarts and Wachira (2010) report high cost of internet connectivity and poor electricity connections in rural areas. The report further notes that 58.9% of computers in all schools are not connected to the internet except one school with all 50 computers connected; that schools in rural set up are unable to use ICT due to internet inaccessibility and affordability.

The principals and senior teachers were also required to indicate how principals could improve ICT integration in management of schools. The responses were presented in Table 4.13.

Table 4.13: Principals' and Senior teachers' Responses on Improving ICT use

	Principals		Senior teachers	
How to improve ICT	Frequency	%	Frequency	%
Training more staff	45	90	38	76.0
Buying More computers	4	8.0	10	20.0
Teaching computer class	1	2.0	2	4.0
Total	50	100.0	50	100

Table 4.13 reveal that, majority (90%) and 76% of principals and senior teachers respectively indicate that computer use can be improved through training more staff. The same results were given by the County Director and Sub-county directors of Education during their interview. They reported that, very few principals were using ICT in the management of the public secondary schools. Most of the principals were said to be computer shy and were so busy such that they did not take time to learn and as a result they relied on their secretaries for computer related communications and some were reported not to have active emails. According to DOI theory Kaminski (2011) categorizes adopters of innovation in various categories. These group of respondents represent the late

majority who wait to make sure that adoption of any innovation will only take place if it is in their best interest.

These findings concur with those of Wanjala, Khaemba and Mukwa (2011) who argue that the school principal is the key to the adoption of educational reform. The principals' knowledge, skill, and philosophy determine their ICT integration methods. Effective implementation of educational technology requires adequate training to enable teachers confidently use and integrate ICT in professional operations. This is also in agreement with Etudor-Eyo, Ante and Ema (2011) who argue that there is a significant positive relationship between administrators' use of ICT and administrators' effectiveness in communication; the effectiveness of secondary school administrators in communication is significantly predicted by the use of ICT. The researcher concludes and recommends that government should make ICT tools available in all secondary schools for the administrators. Workshops on the use of ICT should be organized from time to time by the governments and NGOs for school administrators who are not yet ICT literate.

These results also concur with those of Abuga (2014) who recommends that increasing of the number of computers, training of teachers on ICT, having adequate forms of ICT and requesting the government to offer donation to public schools could facilitate ICT integration in management of human resource in public secondary schools. Albirini (2006) support this by noting that lack of ICT focus in initial teacher training/education is a barrier to teachers' use of ICT.

Where there is no effective training on ICT and educational technology, teachers will not be able to use ICT resources for integration in management. It is therefore evident that ICT training for teachers and principals is key to ICT integration in management of public secondary schools.

Further the researcher sought to establish the challenges facing ICT integration by posing an open question to teachers on the same. Majority of the teachers (48 %) indicated that the greatest challenge relating to ICT integration was lack of internet connectivity. This was because most of the schools were not connected to internet. In the case where there was internet, the schools did not allow the teachers to freely use the internet for fear of the high cost of buying bundles. Teachers (30 %) also reported that schools did not have enough computers and in some cases the teachers were not allowed to access the school computers. These computers were only used by students for learning purposes. There was also lack of updated programmes in schools as well as active anti-virus as reported by 12% and four percent of teachers respectively.

The results resonate with those of Manduku, Kosgey & Sang (2006) who observe that ICT is mostly used for record storage purposes, timetabling, communication and secretarial work such as typing examinations and staff meeting minutes in that order while use of internet and power point presentations recorded very low ratings. Mue (2006) observes that ICT application in executing management roles in public schools in Lang'ata have been hindered by various issues such as lack of

facilities, poor training among key stakeholders, financial constraints and insecurity due to lack of security checkup software for the computers and power outages.

4.5 Principal's Characteristics and ICT Integration in Management of Public Secondary Schools

The second objective for this study sought to determine the influence of principals' personal characteristics on ICT integration in management of public secondary schools in Kitui County, Kenya. The principals as well as the senior teachers were required in an open question to indicate the principals' personal characteristics which influenced ICT integration. They reported that, the principals' characteristics which may influence ICT integration in management of public secondary schools include; age, gender, level of education, ICT literacy, attitude and professional experience. The same information was given by both the County Director and Sub-county Directors of Education in the interview. They reported that the principals' characteristics influence ICT integration to a great extent. They said that most of the principals who integrated ICT were male and relatively young. This shows that gender and age influences ICT integration.

The senior teachers and assistant teachers were required to indicate the principal related factor with greatest influence on ICT integration.

4.14: Senior Teachers and Teachers Responses on principal Related Factors

	Senior Teachers		Assistant	Teachers
Factors	Frequency	%	Frequency	%
Age	25	50.0	100	40.0
Gender	15	30.0	80	32.0
Education level	6	12.0	50	20.0
Professional experience	4	8.0	20	8.0
Total	50	100.0	250	100

Table 4.14 shows that, majority (50% and 40%) of the senior teachers and assistant teachers respectively indicated that the principals' age had the greatest influence on ICT integration in management of schools. It was observed that the older the principal the less the integration of ICT in school management and vice versa. This was followed by gender with 32% for the assistant teachers and 30% for the principals. It was reported that most female principals were not using ICT as their male counterparts in school management.

The principals were required to indicate the extent to which the principals' characteristics influence ICT integration in management of public secondary schools. The responses were presented in Table 4.15.

Table 4.15: Principals response on the extent to which principal's characteristics influence ICT integration

Extent	Frequency	%
Great extent	38	76.0
Some extent	10	20.0
Less extent	2	4.0
No extent	0	0.0
Total	50	100.0

Table 4.15 shows that majority (76%) of the respondents indicated that the principal's characteristics which include; gender, age, education level and professional experience influences ICT integration in management of public secondary schools to a very great extent. This agrees with Wozney, Venkatesh and Abrami (2006) who argue that gender differences influences the use of ICT and that male teachers use ICT more in their teaching and learning processes than their female counterparts. According to Gorder (2008) teacher experience is significantly correlated to the actual use of technology hence effective use of computer is related to technological comfort levels and the liberty to shape instruction to teacher perceived student needs.

The researcher further tested first and fourth hypotheses using Pearson correlation test.

H₀₁: There is no statistically significant relationship between principals' age and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₄: There is no statistically significant relationship between principals' professional experience and ICT integration in the management of public secondary schools in Kitui County, Kenya.

The correlation results were presented in Table 4.16.

Table 4.16 Correlation for Principal's age and Professional Experience and ICT Integration in Management of Schools

		Principals age	Professional experience	ICT integration
Principals age	Pearson Correlation	1		-.750**
	Sig. (2-tailed)			.000
	N			350
Professional experience	Pearson Correlation		1	.559**
	Sig. (2-tailed)			.012
	N			350
ICT integration	Pearson Correlation			1
	Sig. (2-tailed)			
	N			

**. Correlation is significant at the 0.05 level (2-tailed).

Table 4.16 shows that there is a strong negative relationship $r(50) = -0.750$, $p < 0.05$ between principal's age and ICT integration. This means that the younger a principal is the more they are likely to integrate ICT in management. There is also a moderate positive relationship $r(50) = 0.559$, $p < 0.05$ between principals professional experience and ICT integration. This means that the more professionally experienced a principal is the more they will integrate ICT in management. The two hypotheses are therefore rejected and conclusion is arrived that; there is a statistically significant relationship between principals' age and ICT integration in the management of public secondary schools and that there is a statistically significant relationship between principals' professional experience and ICT integration in the management of public secondary schools in Kitui County, Kenya.

These findings concur with those of Venkatesh and Morris (2000) who note that the decisions of men and younger worker are more strongly influenced by their attitude toward using the new technology. In contrast, women and older workers are more strongly influenced by subjective norm and perceived behavioral control. According to Haddad and Jurich (2005) age affects teachers' perceptions of ICT and its usage on management. The younger, less experienced teachers use computers in broad micro transformation fashion and they are more likely to be ICT proficient. They have focus on educational courses on ICT and will be less constrained by prior attitudes or habit than their older more experienced colleagues. Edward (2015) Support this by noting that age affects teachers'

perceptions of ICT and its usage on management. The researcher further note that young principals have been seen to integrate ICT more compared to elderly principals this has been attributed to the fact that they went through an education system that had integrated ICT. The study recommends that the Ministry of Education constructs computer laboratories and equip them with ICT tools/equipment for this will facilitate training of teachers and administrators in all areas of management.

The results of this study also concur with those of Gode (2013) who found out that out of 140 respondents, in the category of 23 teacher trainers who were aged between 31 and 40 years, 16 (69.56%) adopted ICT in teaching while 7 (30.44%) had not adopted ICT. In the category of 84 teacher trainers who were aged between 41 and 50 years, 35 (41.67%) adopted ICT while 49 (58.33%) had not adopted ICT. Lastly, in the category of 33 teacher trainers who were over 50 years of age, 1 (3.13%) had adopted ICT while the other 32 (96.97%) had not adopted ICT. The findings show that teachers of the ages 40 years and below had formed large proportion of teacher trainers who adopted ICT. The study therefore recommends that primary teacher training colleges should develop strategies to identify strengths and weakness of various technological resources as well as an evaluation framework. Teacher trainers should also be provided with regular trainings and seminars on how to integrate ICT in teaching and learning process and adopt policies that enhance integration of ICT in the teaching and learning process.

These findings also concur with those of Mogeni (2013) who observes that principal's age affected integration of ICT in schools where principals aged between 30 and 49 years showed higher percentage of ICT integration than those aged between 50 and 60 years who are heading to retire. Teachers should change attitude towards the use and integration of ICT in the schools so as to create information technology in all aspects of teaching and learning institutions.

The relationship between the age and ICT integration is stronger ($r = - 0.75$) compared to between professional experience and ICT integration ($r = 0.559$). These results agree with those of Gorder (2008) who argues that professional experience is significantly correlated to the actual use of technology hence effective use of computer is related to technological comfort levels and the liberty to shape instruction to teacher perceived student needs. National Centre for Education Statistics (2000) reports that teachers with less experience in teaching are more likely to integrate computers in their teaching than teachers with more experience in teaching. However these results are inconsistent with those of Granger, Morbey, Lotherington, Owston and Wideman (2002) who report that there is no relationship between teachers' teaching experience and experience in the use of ICT implying that teachers' ICT skills and successful implementation is complex and not a clear predictor of ICT integration.

The second and third Hypotheses were tested using Chi-square.

H₀₂: There is no statistically significant association between principals' gender and ICT integration in the management of public secondary schools in Kitui County, Kenya. The results were presented in Table 4.17.

Table 4.17: Chi-square tests for association between gender and ICT integration in management of schools

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	57.973 ^a	4	.000
Likelihood Ratio	10.052	4	.001
Linear-by-Linear Association	17.443	1	.000
N of Valid Cases	50		

a. 8 cells (80.0%) have expected count less than 5. The minimum expected count is .05 at 0.05 sig. level.

Table 4.17 shows that there is a significant association $\chi^2(1,4) = 57.973$, $p < 0.05$) between gender and ICT integration. The linear association is very high (17.443). The hypothesis is therefore rejected and conclusion is arrived that; there is a statistically significant association between principals' gender and ICT integration in the management of public secondary schools in Kitui County, Kenya. These results resonate with those of Abuga (2014) who argues that males are conversant

with ICT integration in human resource management than females. The study found out that 53.3 percent of the male teachers and 13.3 percent of the female teachers indicated that they use ICT in management of human resources while 26.7 percent female teachers said that they do not use ICT in management. From the research findings, it is notable that there is more usage of ICT by the male than female teachers. Edward (2015) supports this by noting that male principals integrate ICT more compared to their female counterparts. Markauskaite (2006) observes that Males on average worked with computers significantly more hours per week than females. Jamison-Proctor, Burnett, Finger and Watson (2006), Papaioannou and Kyriacos (2011) and Kay (2006) concur by noting that female teachers integrate technology into their teaching less than the male teachers.

These results are however inconsistent with those of Hoque, Razak and Zohara (2012) who observe that there is no significant difference in computer usage levels based on position, gender and age, while Chepkonga (2015) also notes that there is no significant relationship between the principals' gender and ICT integration in management of public secondary schools. Yukselturk and Bulut (2009) note that gender gap has reduced over the past years, presently a greater number of females than males use internet and web technologies.

A chi-square test was undertaken to test the third Hypothesis:

H₀₃: There is no statistically significant association between principals' level of education and ICT integration in the management of public secondary schools in Kitui County, Kenya.

The results were presented in Table 4.18.

Table 4.18: Chi-square tests for association between level of Education and ICT integration

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	65.423 ^a	4	.000
Likelihood Ratio	9.642	4	.000
Linear-by-Linear Association	19.111	1	.000
N of Valid Cases	50		

a. 8 cells (75.0%) have expected count less than 5. The minimum expected count is .05. 0.05 sig. level.

Table 4.18 shows that there is a significant association ($\chi^2 (1, 4) = 65.423$, $p < 0.05$) between level of education and ICT integration. The hypothesis is therefore rejected and the alternative hypothesis is adopted; there is a statistically significant association between principals' level of education and ICT integration

in the management of public secondary schools. The report from the interview schedule for the Sub-County directors of Education also showed that principal's characteristics influenced the ICT integration in the management of secondary schools. The report indicates that principals who hold masters degree were more willing to use ICT as opposed to those with lower levels of education. This is attributed to the fact that they obtained exposure to ICT during their course work. It is also reported that, the male principals used internet more often than their female counterpart.

These results agree with those of Wanjala, Khaemba and Mukwa (2011) who argue that the principals' knowledge, skill, and philosophy determine their ICT integration methods and that effective implementation of educational technology requires adequate training to enable teachers confidently use and integrate ICT in professional operations. They are also consistent with those of Makhanu (2010), in his study where 188 principals were sampled, results indicate that 73 (38.8%) lack training in ICT, 82 (43.6%) have informal training while 33(33.7%) have certificate level training. The findings indicate that lack of training in ICT could affect use and integration in management. Abuga (2014) supports this by arguing that principals who had trained on ICT were more interested to use it than those who had not. This implies that education level also influenced ICT use.

The results of this study also concur with those of Ogachi (2015) who established that principals with higher level of education had sufficient knowledge on the

importance of ICT. The researcher asserts that information is power and as a principal further his or her education, the better his or her understanding becomes in regard to the use of ICT in administrative task areas. The study further notes that ICT literacy among the principals influence the integration of ICT in administrative task areas. This is manifested by the fact that principals who had integrated ICT in their administrative task areas were found to have participated in ICT training programmes. This is in agreement with DOI theory (Rogers 2003) who observes that one of the factors that influence the adoption of an innovation is the communication channels used to spread information about the innovation.

4.6 School Related Factors and ICT Integration in the Management of Public Secondary Schools

The third objective sought to establish the influence of school related factors on ICT integration in management of public secondary schools in Kitui County, Kenya. The interview schedule report from both the county director and Sub-county Directors of Education indicate that most schools lacked adequate computers, internet connectivity and computer laboratories. This influenced to a great extent integration of ICT in secondary school management.

The respondents were requested to indicate the number of functional computers in their schools. The responses are presented in Table 4.19.

Table 4.19: Functional Computers in the Schools

	Principal		Senior teachers		Teachers	
Number of computers	Frequency	%	Frequency	%	Frequency	%
1 – 5	3	6.0	5	10.0	20	8.0
6 – 10	11	22.0	13	26.0	70	28.0
11- 15	25	50.0	22	44.0	80	32.0
16 – 20	7	14.0	6	12.0	50	20.0
More than 20	4	8.0	4	8.0	30	12.0
Total	50	100.0	50	100.0	250	100

Table 4.19 reveal that most (50% and 44%) of the schools had 11- 15 functional computers according to the principals responses and senior teachers responses. These results are supported by the teachers' responses whereby 32% of teachers indicate that they had 11 - 15 computers in their schools. These results concur with those of a study conducted by Samuel and Zaitun (2007) which reveals that 81.7% schools have computer laboratories used for teaching and learning in Malaysian schools. The survey findings also reveal that 64.2% of the respondents said that personal computers are connected to the central server and 48.6% have computers for use. However majority of computer laboratories are inadequate in specifications and quality hence inadequate use. The results of this study also

agree with those of Goko (2012) who observes that 87.5% of the schools sampled in the study had computers in their schools while 8.3% had none. This was evidence that most schools have some ICTs which can be used in teaching and learning. The researcher observe that 56.3% had less than five computers, 10.4% had ten to fifteen computers, 18.8% had fifteen to twenty computers while 14.6% of the total number of the schools sampled had 20 computers and above.

The observation schedule by the County Director and the Sub county Directors of Education reveal that most of the day schools had less than five computers most of which were used for clerical work in the school. Most of the schools did not have computers in the staffroom. In addition only one school had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies. The researcher recommends that the government should also intensify ICT funding in schools to help subsidize the high ICT costs and increase the number of computers in schools.

The principals and assistant teachers were further required to indicate where they mostly accessed ICT resources. The results were presented in Table 4.20.

Table 4.20: Responses on where the Principals and Assistant Teachers Access ICT

	Principals		Teachers	
Frequency	Frequency	%	Frequency	%
School ICT labs	25	50.0	120	48.0
Office	10	20.0	70	28.0
Home	5	10.0	20	8.0
Cyber café	10	20.0	40	16.0
Total	50	100.0	250	100

Table 4.20 shows that majority (50% and 48%) of the principals and assistant teachers respectively accessed ICT from the school labs. Others accessed ICT from their offices, homes and cyber cafes.

These results agree with those of Goko (2012) who notes that most of the computers in the school were found in the office represented by 47.9%, 43.8% had their computers in the computer laboratory. Only 2.1% had a computer in the staffroom while 6.3% had their computers in other places. Samuel and Zaitun (2007) concurs by noting that 81.7% of the sampled schools had computer laboratories, 64.2% had personal computers connected to the central server and

48.6% had computers for use. However majority of computer laboratories were inadequate in specifications and quality hence inadequate use. Richardson (2008) also reports that only 6% of lower and 35% of upper secondary schools managed to get 1-2 computers mainly for management purposes. Katulo (2009) supports this by noting that schools in Namibia had computers with no internet connectivity which hinder use of the internet and email. Similarly, Swarts and Wachira (2010) report high cost of internet connectivity and poor electricity connections in rural areas. The report further notes that 58.9% of computers in all schools were not connected to the internet except one school with all 50 computers connected; that schools in rural set up were unable to use ICT due to internet inaccessibility and affordability. Kukali (2013) also reports lack of internet connectivity which is a hindrance to communication and linkages through email and fax.

Further the senior teachers were required to indicate the school related factor with the highest influence on integration of ICT in management of schools, using a scale of 1 – Great Extend, 2- Some Extend, 3 –Undecided, 4 - Less Extend, 5-No extent.

The results are as shown in table 4.21.

Table 4.21: Senior Teachers Response on School Related Factors and ICT Integration in the Management of Schools

Factors	1		2		3		4		5		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
School location	26	52.0	20	40.0	3	6.6	4	8.0	2	4.0	50	100
School type	10	20.0	14	28.0	4	8.0	9	18.0	13	10.0	50	100
ICT Technician	11	22.0	12	24.0	7	14.0	10	20.0	10	20.0	50	100
Teachers ICT skills	12	24.0	10	20.0	10	20.0	10	20.0	6	12.0	50	100

Table 4.21 shows that majority (52%) of senior teachers strongly agreed that, school location influences ICT integration. Also 20% of the senior teachers strongly agreed that school type influences ICT integration and 22% and 24% strongly agreed that the school technician and teachers skills influence ICT integration.

Further, the principals were requested to indicate the extent to which the following school related factors influence ICT integration, using a scale of 1 – Great Extend, 2- Some Extend, 3 –Un-decided, 4 - Less Extend, 5-No extent.

Table 4.22: Principals’ Responses on the Extent to which School Related Factors influence ICT integration

	1		2		3		4		5		Total	
School related factors	F	%	F	%	F	%	F	%	F	%	F	%
Internet	30	60.0	12	24.0	3	6.0	3	6.0	2	4.0	50	100
Projectors	9	18.0	12	24.0	10	20.0	9	18.0	10	20.0	50	100
Computers(desk tops, laptops)	25	50.0	10	20.0	5	10.0	6	12.0	4	8.0	50	100
Printers	19	38.0	14	28.0	7	14.0	7	14.0	3	6.0	50	100
Technical support	6	12.0	5	10.0	12	24.0	17	34.0	10	20.0	50	100

Results in Table 4.22 shows that majority (60%) of the principals observed that to a great extent, internet influenced ICT integration in school management. This was followed by computers which include, desk tops as well as laptops. Others include; printers, projectors and technical support. However, projectors and technical staff did not seem to influence ICT integration to a great extent. These results agree with those of Mwikya (2014) who reveals that integration of ICTs in

the secondary schools is hindered by factors such as inadequate infrastructure and teachers' poor pre-service training in ICT. NCES (2000) reveals that 99% of full-time regular public school teachers have access to computers or the internet somewhere in their schools. The survey also establish that 39% of the teachers use computers and the internet to create instructional materials, 34% use them a lot for management record keeping and less than 10% reported accessing model lesson plans or research and best practice using computers or the internet.

The researcher further used Chi-square to test the hypothesis H_{05} : There is no statistically significant association between school type and ICT integration in the management of public secondary schools in Kitui County, Kenya.

The results were presented in Table 4.23.

Table 4.23: Chi-square tests for association between school type and ICT integration

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	48.123 ^a	4	.001
Likelihood Ratio	8.21	4	.001
Linear-by-Linear Association	17.210	1	.000
N of Valid Cases	50		

a. 8 cells (75.0%) have expected count less than 5. The minimum expected count is .05.
0.05 sig. level.

Table 4.23 shows that there is a significant association ($\chi^2 (1, 4) = 48.123$, $p < 0.05$) between school type and ICT integration. The hypothesis is therefore rejected and alternative hypothesis is adopted that there is a statistically significant association between school type and ICT integration in the management of public secondary schools. These results are in line with study findings by Manduku, Kosgey and Sang (2006) which reveal that most of the day schools used both traditional and modern ICT related aspects in performing management functions but a slight difference is observed where more boarding schools seem to adopt and use modern ICT as compared to day secondary schools. The results imply that more boarding secondary schools have embraced

modern ICT in the performance of management functions as compared to day schools.

To determine the influence of different school types on ICT integration, multiple regression analysis was used. The results were presented in Table 4.24.

Table 4.24: Coefficients of the influence of school type and ICT integration

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.764	.033		23.150	.000
Boys boarding(X ₁)	.622	.039	.663	3.130	.002
Girls boarding (X ₂)	.505	.063	.449	1.667	.001
Mixed boarding(X ₃)	.208	.050	.938	4.16	.000
Mixed day (X ₄)	-.008	.048	-.030	41.83	.003

Dependent Variable: ICT integration by schools

The regression model was;

$$Y = 0.764 + 0.622X_1 + 0.505X_2 + 0.208X_3 - 0.008X_4$$

This model shows that the boys boarding schools have the greatest contribution to the model ($\beta=0.764$). This means that a unit change in boys boarding school

would cause a change in ICT integration in management of schools by a factor of 0.764 at 5% significant level. This was followed by girls boarding school which had a contribution of 0.622 and mixed boarding schools with a contribution of 0.208. It was however established that there was a negative contribution from mixed day ($\beta = -0.008$). This implied that a unit change in mixed day secondary schools would change the ICT integration by a factor of -0.008 .

The results of this study are also in agreement with those of Mwikya (2014) who observes that day schools in Migwani district had too few computers compared to the users in the schools. This not only limits the access but it also becomes difficult to rely on them for teaching and learning. Goko (2012) observes that most of the day schools had less than five computers most of which were used for clerical work in the school. Most of the schools did not have computers in the staffroom. This limits the teachers to use computers to prepare their class presentation. In addition only one school had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies. This implies that school type influences ICT integration.

Further the researcher used Pearson correlation coefficient to test the next two hypotheses:

H_{06} : There is no statistically significant relationship between ICT infrastructure and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₀₇: There is no statistically significant relationship between availability of technical staff and ICT integration in the management of public secondary schools in Kitui County, Kenya.

Table 4.25: Correlation for ICT infrastructure and its integration in management of schools

		Computer infrastructure	Technical staff	ICT integration
Computer infrastructure	Pearson	1		
	Correlation			.842**
	Sig. (2-tailed)			.000
	N			50
Technical staff	Pearson		1	
	Correlation			.659**
	Sig. (2-tailed)			.012
	N			50
ICT integration	Pearson			1
	Correlation			
	Sig. (2-tailed)			.000
	N			50

Correlation is significant at the 0.05 level (2-tailed).

Table 4.25 shows that there is a strong positive correlation $r(50) = 0.842$, $p < 0.05$ between computer infrastructure and ICT integration in management of public secondary schools. These results concur with those of Kukali (2013) who notes that 100% of principals, 93.8% of deputy principals and 90.6% of director of studies cited lack of adequate ICT infrastructure as a major challenge in use and integration of ICT in management. In 50% of the schools, respondents observed

that there was inadequate room for ICT equipment hence congestion limiting teachers to make maximum use of computers and the internet. Most respondents reported either lack of or poor internet connectivity which was a hindrance to communication and linkages through email and fax. The school management did not make adequate use of the internet for purposes of professional and educational resource; yet such processes brings into focus best management practices such as decision making and problem solving (Kukali, 2013).

The results indicate that there is also a strong positive correlation $r(50) = 0.659$, $p < 0.05$ between technical staff support and ICT integration in management of public secondary schools. These results agreed with those of Yilmaz (2011) who argues that in providing schools with hardware and internet connections, it is also crucial to provide the schools with technical support with regard to repair and maintenance for the continued use of ICT in schools. The study reports that problems such as the breakdown of ICT devices and not having enough quick support led to wastage of time. Principals and teachers, who do not have quick support or lack technical knowledge, encounter problems and frustrations concerning the technical management of ICT tools. Kersaint (2007) concurs with these finding by pointing out that one of the major obstacles to optimizing computer use in high schools has been the lack of timely technical support. In some extreme cases involving schools in remote areas computers take months to be repaired due to unavailability of ICT technicians. It is thus hypothesized that ICT support has great impact on principal's use of technology as it can help boost

ICT integration in management of schools. With availability of technical staff principals will effectively integrate ICT in management of schools.

The results of this study resonate with those of Albirini (2006) who found out that teachers need on-site, classroom based technical support from qualified ICT personnel/technician. The support also includes pedagogical advice on how they can choose relevant materials from the internet and sample them out for use. Technical support for teachers is limited in most schools. Where such support is available, it is not adequate. According to Jones (2004) lack of technical support is one of the major barriers that result in computers being underutilized in the classes. Teachers were not willing to use computers because they were not sure where to turn for help when something went wrong while using computers. The researcher further argues that breakdown of a computer causes interruptions and if there is lack of technical assistance, then it is likely that the regular repairs of the computer will not be carried out resulting in teachers not using computers in teaching. The effect is that teachers will be discouraged from using computers because of fear of equipment failure since no one would give them technical support in case there is technical problem. Availability of ICT technician will therefore influence ICT integration in management of secondary schools.

Further the researcher tested the hypothesis below using Chi-square test.

H₀₈: There is no statistically significant association between teachers' ICT skills and ICT integration in the management of public secondary schools in Kitui County, Kenya.

The results were presented in Table 4.26.

Table 4.26: Chi-square tests for association between Teachers ICT skills and ICT integration

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.11 ^a	4	.000
Likelihood Ratio	7.21	4	.000
Linear-by-Linear Association	15.310	1	.000
N of Valid Cases	50		

a. 8 cells (75.0%) have expected count less than 5. The minimum expected count is .05 at 0.05 sig. level.

Table 4.26 shows that there is a significant association ($\chi^2(1, 4) = 58.11, p < 0.05$) between teachers ICT skills and ICT integration. This hypothesis is therefore rejected and the alternative hypothesis is adopted; that there is a statistically significant association between teachers ICT skills and ICT integration in the management of public secondary schools. This view is consistent with Clark (2000) and Reilly (2004) who note that the level of ICT integration in

management of schools depends on how teachers are trained to use computers since they are at the core of any curriculum innovation. This also concurs with Mingaine (2013) who confirms that schools which were implementing ICT had a higher number of staff qualified in ICT compared to schools which were not implementing. This agreed with observation that in schools which were implementing ICT had considerable ICT infrastructure, consequently teachers who were in those schools and not competent in ICT had a chance to train.

The principals were finally requested to indicate the major school factors that influence integration of ICT in management of schools. The results were presented in Table 4.27.

Table 4.27: Major school related factors influencing ICT integration in management of schools

	Principals		Teachers	
Frequency	Frequency	%	Frequency	%
Lack of adequate ICT facilities	17	34.0	85	34.0
Financial constraint	28	56.0	110	44.0
Lack of trained personnel	1	2.0	15	6.0
Out dated software	4	8.0	40	16.0
Total	50	100.0	250	100.0

Table 4.27 reveals that majority (56% and 44%) of the principals and teachers respectively indicated that financial constraint was the major school related factor

that influence principals' integration of ICT in management of schools followed by lack of adequate facilities (34%).

The same results were given by the Sub-county directors of Education during their interview. They reported that the major reason why many schools do not use ICT is lack of computer infrastructure. The infrastructure include; computers, computer labs and computer accessories. Report from the Sub-county Directors of Education reveal that most schools do not have computer infrastructure therefore relies on commercial cyber cafés for communication. It was also reported that many schools do not have computer laboratories as well as adequate computers. These results agree with those of Swarts and Wachira (2010) who note that the high cost of ICT infrastructure, internet connectivity and electricity connectivity hinders the effective use of internet and email in schools in the remote areas.

Manduku, Kosgey and Sang (2006) support this by noting that despite the benefits of ICT, school management has not fully realized the full potential of its integration and use in performing management tasks due to several challenges, among them; lack of skills and financial constraints. This is also in agreement with Mue (2006) who found out that effectiveness of ICT application in executing management roles in public schools have been hindered by various issues such as lack of facilities, poor training among key stakeholders, financial constraints and insecurity due to lack of security checkup software for the computers and power outages. Majanja (2001) supports this by observing that affordability of ICT

infrastructure could be limited by the high cost of putting infrastructure in place and is linked with the issue of poverty. At the institution level, expensive hardware and software as well as the high cost of communication and services restrict access to ICT. Most schools in Kenya do not have the means to purchase expensive computers and hardware to provide training for their staff.

4.7 Community Related Factors and ICT Integration in Management of Public Secondary Schools

The last objective for this study was to determine the community related factors influencing integration of ICT in management of public secondary schools. The principals were requested to indicate the major sources of their computers. The results were presented in Table 4.28.

Table 4.28: Major Sources of computers for schools

Source	Principals		Senior Teachers	
	Frequency	%	Frequency	%
Parents	10	20.0	12	24.0
Community	3	6.0	2	4.0
Government	26	52.0	25	50.0
Donations	11	22	11	22.0
Total	50	100.0	50	100

From Table 4.28, we can note that majority (52% and 50%) of the principals and senior teachers respectively indicated that the government was the major source of the computers. Other sources included; donations (22%), parents (20%) and community (6%) as per the principals. These results are in line with those of Samuel and Zaitun (2007) in a paper that examined the available ICT resources and the level of ICT skills of English language teachers in Malaysian schools. The paper indicates that MoEST Malaysia facilitated capacity building for administrators, teachers and other school managers from rural areas in ICT to enhance literacy levels and match the continuously introduced software and hardware in the market.

Amrung (2007) confirm this by noting that the MoE provided both financial and material support in terms of servers and computers per school in Thailand schools. The role of the MoEST and international organizations could be counted on as future prospects in these countries. Other sources may include Non-Governmental Organizations (NGOs), donor programs and projects such as Microsoft Partners in learning program, cyber school technology solutions, New Partnership in African Development (NEPAD), Uganda connect program and computer for schools program (Hennessey, Onguko, Harrison, Ong'ondi, Namalefe's & Naseem, 2010). Further, Agyeman, (2007) concludes that through the same partnerships schools benefitted in acquisition of hardware and software which developed the ICT status in Uganda.

The results of this study also agree with those of Ayere, Odera and Agak (2010) who found out that through UNESCO, NEPAD and Computer for Schools Kenya (CFSK) national schools obtained computers besides training of teachers and principals at in-service level. Farrel (2007) survey findings report that Non-Governmental Organizations (NGOs) and donors in partnership with the MoE have variously contributed computers to schools. This concur with Kukali (2013) who argues that most of the special schools in Bungoma County, Kenya, acquired computers and other school infrastructure through the MoE, Constituency Development Funds (CDF) and international donors. Oloo (2009) support this by reporting that 16.07% of the sampled schools received computers through PTA

projects, 17.86% CFSK, 7% through individual donations while 54% through school funds.

The teachers were also requested to indicate how the community supported ICT integration in schools. The responses were presented in Table 4.29.

Table 4.29: Teachers Responses on Community Support on ICT

Frequency	Frequency	%
Donations	56	22.4
Security	168	67.2
Advice	6	2.4
Total	250	100

Table 4.29 shows that majority (67.2%) of the respondents point out that the community supported more on security. However there were a few donations given by the community.

The respondents were requested to indicate the number of computers received from their major source. The results are as shown in table 4.30.

Table 4.30: Number of Computers Received from the Major Source

Number of computers	Principals		Senior Teachers	
	Frequency	%	Frequency	%
Less 5	0	0.0	0	0.0
5 – 10	18	36.0	15	30.0
11 – 15	22	44.0	24	48.0
16 – 20	5	10.0	5	10.0
Above 20	5	10.0	4	8.0
Total	50	100.0	50	100

It can be observed from Table 4.30 that majority (48% and 44%) of the senior teachers and principals had received 11 to 15 computers from their major source. This was followed by those who had received 5 to 10 (36%). It can therefore be concluded that the government is the major source of computers in schools. This concurs with Kukali (2013) who notes that most of the special schools in Bungoma County, Kenya acquired computers and other school infrastructure from the Ministry of Education, Constituency Development Fund (CDF) and international donors. Katulo (2009) points out that the Ministry of Education (MoE) through the National Educational Technology Service and Support (NETSS) centre supported schools through free technical support services. Ayere, Odera and Agak (2010) in a Comparative study in Kenya reveal that through UNESCO, NEPAD and Computer for Schools Kenya (CFSK) national schools obtained computers besides training of teachers and principals at in-service level.

This is also in agreement with Farrel (2007) who reports that Non-Governmental Organizations (NGOs) and donors in partnership with the MoE have variously contributed computers to schools.

The respondents were also requested to indicate the extent to which the neighborhood security influences ICT integration. The results were presented in Table 4.31 below.

Table 4.31: Extent to which the Neighborhood security influences ICT integration

	Principal's		Senior Teacher		Assistant teacher	
	Frequency	%	Frequency	%	Frequency	%
Great extent	12	24	13	26	115	46
Moderate extent	29	58	26	52	95	38
No extent	36	12	7	14	32	13
Undecided	3	6	4	8	8	3
Total	80	100.0	50	100.0	250	100.0

Table 4.31 shows that majority (58% and 52%) of the principals and senior teachers respectively indicate that the neighborhood security influences ICT integration to a moderate extent while 46% of the teachers' responses show that neighborhood security influence ICT integration to a great extent. These results agree with those of Rusten and Hudson (2013) who argue that appropriate security measures should be taken by the school management and the community at large to protect school property. According to Rusten and Hudson (2013) the high cost of investing in technology in public schools often can be justified partly by allowing the new computer facilities to be used by members of the school community. If this is a priority, then the community will highly support and provide the necessary security for the ICT infrastructure.

Bartlett, Akala, Semyalo and Stafford (2013) support this by noting that physical security of the schools and the classrooms in which computers may be installed will highly be determined by the schools' location. Providing sufficient security in the classroom and at the school to prevent theft of equipment, software, and supplies can be expensive and it is often only possible for one or two rooms in a school. These results also concur with those of Gakuu and Kidombo (2010) who report that schools did not provide any access to the community due to security reasons. The study reports that schools had suffered several burglary attempts and therefore, the school management became hesitant to let the community use their computers. Kersaint (2006) support this by reporting that insecurity is one of the

problems that prevent school establishments from equipping themselves with computers.

These results were supported by the county director and sub-county directors of Education who said that the community was very useful in providing the security of the computers in the school. Some of the community members also ended up donating some computers although the government was reported as the major source of computers followed by the parents.

The researcher further used Chi-square to test the hypothesis below;

H₀₉: There is no statistically significant association between community support and ICT integration in the management of public secondary schools in Kitui County, Kenya.

H₁₀: There is no statistically significant association between school security and ICT integration in management of public secondary schools in Kitui County, Kenya.

The results were presented in Table 4.32 and 4.33.

Table 4.32: Chi-square tests for association between community support and ICT integration

	Value	Df	Asymp. Sig. (2 sided)
Pearson Chi-Square	49.444 ^a	4	.001
Likelihood Ratio	6.64	4	.003
Linear-by-Linear Association	15.32	1	.000
N of Valid Cases	50		

a. 8 cells (75.0%) have expected count less than 5. The minimum expected count is 0.05.
0.05 sig. level.

Table 4.32 shows that there is a significant association ($\chi^2 (1, 4) = 49.444$, $p < 0.05$) between community support and ICT integration. The hypothesis is therefore rejected while the alternative hypothesis is adopted that, there is a statistically significant association between community support and ICT integration in the management of public secondary schools. From the interview schedule, the County Director and Sub-county directors of Education reported that the major source of computers for schools was the government through a programme known as computers for schools. However these computers are not enough and therefore the parents, donors and the community should also assist schools to acquire more computers.

These findings are in line with those of Ayere, Odera and Agak (2010) who reveal that through UNESCO, NEPAD and Computer for Schools Kenya (CFSK) national schools obtained computers besides training of teachers and principals at in-service level. Farrel (2007) reports that Non-Governmental Organizations (NGOs) working in partnership with the MoE have contributed computers to schools from time to time. Oloo (2009) reports similar situation that 16.07% of schools received computers through PTA projects, 17.86% CFSK, 7% through individual donations while 54% through school funds.

Table 4.33: Chi-square tests for association between school security and ICT integration

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	50.411 ^a	4	.000
Likelihood Ratio	7.6	4	.000
Linear-by-Linear Association	16.3	1	.000
N of Valid Cases	50		

a. 8 cells (75.0%) have expected count less than 5. The minimum expected count is .05.at 0.05 sig. level.

Table 4.33 shows that there is a significant association ($\chi^2 (1, 4) = 50.411$, $p < 0.05$) between school security and ICT integration. This hypothesis is therefore rejected while the alternative hypothesis is adopted that; there is a statistically significant association between school security and ICT integration in the

management of public secondary schools. These results concur with those of Bartlett, Akala, Semyalo & Stafford (2013) who affirm that providing sufficient security to prevent theft of ICT equipment can be expensive which may cause principals to make it very difficult for students to use computers hence in some schools, the computers are stored and not turned on in quite a while.

Gakuu and Kidombo (2010) report that schools denied members of the community access to their ICT infrastructure due to security reasons. The study observes that some schools have suffered several burglary attempts and therefore, the school management do not allow the community to use their computers. Kersaint (2006) argues that insecurity is one of the problems that prevent school establishments from equipping themselves with computers. It appears, therefore that security of ICT infrastructure is a major concern in schools.

4.8 Multiple Regression Analysis

Sequential multiple regression analysis was applied to determine the variables that best predicted and explained the ICT integration in the management of secondary schools. The results were presented in the subsequent Tables.

Table 4.34: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.878(a)	.771	.721	3.340

a Predictors: (Constant), Principal related factors, school related factors and community related factors.

Table 4.34 shows that 77.21% of variations in the ICT integration in management of schools is explained by the factors (Principal related factors, school related factors and community related factors.). The remaining 22.79% is determined by other factors. To test the fitness of the model ANOVA was used. The results were presented in Table 4.35.

Table 4.35: ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.029	4	17.18	5.397	.000(a)
	Residual	55.223	46	11.2		
	Total	175.252	50			

a Predictors: (Constant), Principal related factors, school related factors and community related factors.
b Dependent Variable: ICT integration in management of schools

Analysis of variance (ANOVA) was done to establish the fitness of the model used. The ANOVA table shows that the F-ratio ($F=5.397$, $p=.000$) was statistically significant. This means that the model used was appropriate and the relationship of the variables shown could not have occurred by chance.

Table 4.36: Multiple Regression Coefficients (a)

Model		Standardize				Sig.
		Unstandardized		t	B	
		Coefficients	Coefficients			
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	1.161	.408		2.842	.001
	Principal related factors(X ₁)	1.136	.339	1.655	3.346	.002
	School related factors (X ₂)	.623	.391	.218	1.593	.000
	Community related factors(X ₃)	.027	.139	.061	.193	.000

a Dependent Variable: ICT integration in management of schools

Table 4.36 shows that all the independent variables (Principal related factors, school related factors and community related factors.) significantly ($P<0.05$) predict the change in the ICT integration in management of schools.

The regression model is;

$$Y = 1.161 + 1.36X_1 + 0.623X_2 + 0.027X_3$$

This model shows that the principal related factors have the greatest contribution to the model ($\beta=1.136$). This means that a unit changes in principals' related factors would cause a change in ICT integration in management of schools by a

factor of 1.36 at 5% significant level. It was also established that all the factors had a significant contribution to ICT integration in management of schools ($P < 0.05$).

4.9 Interview schedule report

The Interview schedule was used to collect data from the Sub-county Directors of Education and the County Director of Education. The County director of Education reported that, although ICT integration in management of secondary schools has been introduced by the ministry of Education science and technology, many schools in Kitui County had not started using them. This was because of the principals' personal factors in most schools. The same report was given by the sub-county director in Sub-County "A" who said, "*Most young principals use ICT more than the older principals*". The Sub-County Director in Sub-county "B" also said, "*Most young principals like using ICT in school management compared to their counterpart who are a bit aged*". The implication of these results is that, the principal's personal characteristics influences ICT integration.

The county director also reported that, most schools in the County lack adequate computer infrastructure which include, computers and their accessories, computer labs and internet connectivity. This report was supported by the Sub-County Director in Sub County "C" who said, "*it is difficult for some schools to integrate ICT in school management since most schools lack adequate computers and internet connectivity*". This shows that school related factors influence ICT

integration. Concerning community related factors, it was reported by the County Director of Education that, the community can assist in donating some computers to the schools. This can assist in the provision of computer infrastructure. The Sub-County Director of Education in Sub-county “D” said, *“If a school is in a community which supports the principal, some people in the community might support the school by donating some computers”*. This would help the school in integrating ICT. Sub-county Director of Education in Sub-county “E” also said, *“The insecurity of some communities discourage some schools from buying the ICT infrastructure”*. The respondent indicated that computer theft had been reported in some schools. This therefore is an indication that school security influence the integration of ICT in management of schools.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study and the conclusions drawn from the findings. Recommendations made from findings and suggestions for further research are also presented.

5.2 Summary of the study

This study sought to investigate the factors influencing ICT integration in the management of public secondary schools in Kitui County, Kenya. The study utilized both descriptive and inferential statistics. The analysis was based on findings from four research objectives which sought; to determine the extent to which ICT has been integrated in the management of public secondary schools, to determine the influence of principals' personal characteristics on ICT integration in management of public secondary schools, to establish the influence of school related factors on ICT integration in management of public secondary schools and to assess the influence of community related factors on ICT integration in the management of public secondary schools in Kitui County, Kenya.

Chapter two covered a literature review of aspects explored under factors influencing ICT integration in management of public secondary schools which includes; the extent of ICT integration, principals' personal characteristics, school related factors, and community related factors. It also consisted of a summary of literature review, theoretical framework and a conceptual framework. Chapter three dealt with research methodology that was used in conducting the research study. It specifically dealt with the research design, target population, sample size and sampling techniques, research instruments that were divided into sections, instrument validity, instrument reliability, data collection procedures data analysis techniques and ethical considerations.

The study adopted the descriptive research design. The design is also useful in describing the characteristics of a large population, makes use of large samples, thus making the results statistically significant even when analyzing multiple variables, many questions can be asked about a given topic giving considerable flexibility to the analysis, the design allows use of various methods of data collection like questionnaire and interview methods and it also makes use of standardized questions where reliability of the items is determined. The researcher used census sampling to sample 58 principals, 58 senior teachers, 16 sub-County Directors of Education and One County Director of Education in Kitui County. Krejcie and Morgan (1970) table was used to sample 266 assistant teachers by use of random sampling.

Once data was collected, it was post coded and analysed using SPSS. Descriptive statistics was used to analyze, tabulate and present data. Quantitative data gathered from closed ended questions was first coded and organized into similar themes. To integrate qualitative data gathered from open ended questions into inferential data, it was post coded and tallying of similar responses per item was done after which frequency counts were made of all respondents making similar responses. Results of data gathered from closed ended and open items were reported in frequency tables, and explanations of the findings were made based on themes. The correlations and Chi-square test was used to determine the relationship between variables and strength of association between the independent variables respectively. The significance level was set at $\alpha = 0.05$ which was used to determine the significance levels. In chapter four, data was analysed, presented and interpretations were made based on the four research objectives. Chapter five dealt with a summary of the study, conclusions were drawn from the findings of the study, recommendations and suggestions for further research were also made.

5.3. Summary of Findings

The questionnaire return rate indicated that out of 58 questionnaires distributed to principals and senior teachers, 50 questionnaires were returned by each category of respondents. This constitutes 86% of principals and senior teachers. It was also observed that out of 266 questionnaires distributed to the assistant teachers 250

questionnaires which constitute 94% were returned. The demographic findings of the study indicate that majority of the respondents (60% and 56%) of the principals and senior teachers respectively were male. It is also observed that 68% of the assistant teachers were male. On age, it was established that majority (64%) of principals are aged between 41 and 50 years while majority (50%) of senior teachers are aged between 30 and 40 years. Also 40% of the assistant teachers are aged between 30 and 40 years. It was also observed that (32%) of the assistant teachers and (10%) of senior teachers were below 30 years of age while no principal was aged below 30 years. The academic level results indicate that majority of the principals (58%), senior teachers (64%) and assistant teachers 80% had Bachelor of Education Degree as their highest qualification. This was followed by those with master's degree of whom 36% were principals, 24% were senior teachers and 4% were assistant teachers. On experience, majority of the Principals (54%) had a working experience of more than 15 years while most (50%) of senior teachers had an experience of 10 to 15 years. It was also established that majority (36%) of assistant teachers had worked for five to nine years. The ANOVA table revealed that the F-ratio ($F=5.397$, $p=.000$) was statistically significant.

5.3.1 ICT Integration and management of public secondary schools

The study established that (78%, 60% and 59%) of the principals, senior teachers and assistant teachers respectively only use ICT in school management less

frequently and that 12% of the principals used ICT in management once per month with only 10% using on daily basis. Among those who use ICT, majority (70%) of the principals used ICT for internal exams to a great extent. On internet use the study established that; majority (58%) of principals and 64% of senior teachers used internet less frequently. Those who used internet on daily basis were 24% for the principals and 20 % for the senior teachers. It was also noted that some principals (18%) and 16% senior teachers had never used internet. Majority (90%) and 76% of the principals and the senior teachers respectively indicate that computer use can be improved through training more staff in ICT. These results were supported by the county Director and the Sub-County Directors of Education in their interviews when they said that most of the principals were computer shy and were said to be so busy such that they did not take time to learn and as a result they relied on their secretaries for computer related communication and some were reported not to have active emails. However the interviews indicated that some principals were indeed using ICT in management of schools and especially in communication with teachers, parents and suppliers.

5.3.2 Principals characteristics and ICT Integration in Management of Public Secondary Schools

The study established that the principal's characteristics which include; gender, age, level of education and professional experience influence ICT integration in

management of public secondary schools to a very great extent. This was evidenced by the responses of majority (76%) of the respondents. Majority (50% and 40%) of the senior teachers and assistant teachers respectively indicated that the principals' age had the greatest influence on ICT integration in management of schools. This implies that the older the principal the less the level of ICT integration and vice versa. Results from Correlation test showed that there is a strong negative relationship $r(50) = -0.750$, $p < 0.05$ between principal's age and ICT integration. This means that the younger a principal is the more they are likely to integrate ICT in management.

The study established that gender influences ICT integration in management of schools. This was evidenced by the fact that 32% of the assistant teachers and 30% of the principals respectively reported that most female principals were not using ICT as their male counterparts in school management. Results from Chi-square test for independence indicates that there is a significant association $\chi^2(1,4) = 57.973$, $p < 0.05$ between gender and ICT integration. The linear association is very high (17.443). Reports from interview schedule for the County Director and Sub-county Directors of Education indicate that, the male principals used internet more often than their female counterpart.

The study established that principal's professional experience influence ICT integration in management of schools. Results from Pearson Correlations test indicates that there is a strong positive relationship $r(50) = 0.559$, $p < 0.05$

between principals professional experience and ICT integration. This means that the more professionally experienced a principal is the more they will integrate ICT in management. The findings of this study also established that principal's level of education influence ICT integration in management of public secondary schools. Results from Pearson Chi-square test indicates that there is a significant association ($\chi^2 (1, 4) = 65.423, p < 0.05$) between level of education and ICT integration. The report from interview schedule for the Sub-county Directors of Education also shows that principal's characteristics influence the ICT integration in management of secondary schools. The report indicates that principals who hold masters degree were more willing to use ICT as opposed to those with lower levels of education. This is attributed to the fact that they obtained exposure to ICT during their course work hence they have ICT skills.

5.3.3 School related factors and ICT integration in management of public secondary schools

The study revealed that most (50% and 44%) of the schools had 11- 15 functional computers according to the principals and senior teachers responses. These results are supported by the assistant teachers' responses whereby 32% of teachers indicate that they had 11 - 15 computers in their schools. The results also indicate that majority (50% and 48%) of the principals and assistant teachers respectively accessed ICT from the school laboratories while others accessed it from their offices, homes and cyber cafes. The study established that, school location

influences ICT integration. This is as it was indicated by the majority (52%) of senior teachers. Also 20% of the senior teachers strongly agreed that school type influences ICT integration and 22% and 24% of the senior teachers strongly agreed that the school technician and teachers skills influence ICT integration.

The study also established that lack of internet and computers negatively influenced ICT integration in school management to a great extent. This was as evidenced by responses of majority (60%) of the principals. This was followed by lack of computers which include desk tops as well as laptops. Others include; printers, projectors and technical staff. However, projectors and technical staff did not seem to influence ICT integration to a great extent. Results from Pearson chi-square test indicated that there is a significant association ($\chi^2 (1, 4) = 48.123, p < 0.05$) between school type and ICT integration. A regression model indicated that boys boarding schools have the greatest contribution to the model ($\beta=0.764$). This was followed by girls boarding school which had a contribution of 0.622 and mixed boarding schools with a contribution of 0.208. It was however established that there was a negative contribution from mixed day ($\beta=-0.008$). This implied that a unit change in mixed day secondary schools would change the ICT integration by a factor of $- 0.008$. The study also established that there is a significant association ($\chi^2 (1, 4) = 58.11, p < 0.05$) between teachers ICT skills and ICT integration. It also indicated that there is a strong positive correlation $r(50) = 0.842, p < 0.05$ between computer infrastructure and ICT integration in management of public secondary schools and also a strong positive correlation

$r(50) = 0.659, p < 0.05$ between technical staff and ICT integration in management of public secondary schools. The study also reveals financial constraint was the major school related factor that influence principals' integration of ICT in management of schools as it was reported by majority (56% and 44%) of the principals and teachers respectively. This was followed by lack of adequate facilities (34%).

The same results were given by the County Director and Sub-county directors of Education during their interview. They reported that the major reason why many schools do not use ICT is lack of computer infrastructure. The infrastructure include; computers, computer laboratories and computer accessories. Report from the Sub-county Directors of Education reveal that most schools do not have computer infrastructure therefore relied on commercial cyber cafés for communication. It was also reported that many schools do not have computer laboratories as well as adequate computers. This implies that principals lack adequate funds to acquire and maintain adequate functional ICT infrastructure hence this influence the level of ICT integration in management of schools.

5.3.4 Community Related Factors and ICT Integration in Management of Public Secondary Schools

The study established that the government was the major source of the computers that were in schools. This is as indicated by majority (52 and 50%) of the principals and senior teachers respectively. It was indicated that (48% and 44%)

of the senior teachers and principals had received 11 to 15 computers from the government. Other sources included; donations (22%), parents (20%) and community (6%) as per the principals. Majority (67.2%) of the respondents point out that the community supported more on security. However there were a few donations given by the community. Results from chi-square test also shows that there is a significant association ($\chi^2 (1, 4) = 49.444, p < 0.05$) between community support and ICT integration. From the interview schedule, the County Director and Sub-county directors of Education reported that the major source of computers in the schools was the government through a programme known as computers for schools. However these computers are not enough and therefore the parents, donors and the community should also assist schools to acquire more computers.

The study also established that the neighborhood security influences ICT integration to a moderate extent as indicated by (58% and 52%) of the principals and senior teachers respectively while 46% of the assistant teachers' responses show that neighborhood security influence ICT integration to a great extent. Results from chi-square test also indicate that there is a significant association ($\chi^2 (1, 4) = 50.411, p < 0.05$) between school security and ICT integration. From the interview schedule the County Director and Sub-county Directors of education indicated that school security influence ICT integration in management of schools in that in areas that are prone to insecurity there has been few cases of computer theft in schools.

5.4 Conclusion

From the findings of the study it was established that majority of the school principals use ICT in school management less frequently while internet is rarely used. It was also noted that some principals, senior teachers and assistant teachers had never used internet. It was also observed that principal's characteristics which include; age, gender, level of education and professional experience influence ICT integration in management of public secondary schools to a very great extent.

The study has also established that most of the principals and teachers accessed ICT from the school laboratories while others accessed it from their offices, homes and cyber cafés. The research also concludes that school location influences ICT integration. This is because the schools which were near major towns were using ICT more than those outside the major towns. Also, the school computer infrastructure, availability of technical staff and teachers ICT skills significantly influence ICT integration in management of public secondary schools. The study also found out that the government was the main source of computers for most schools whereby most schools had received 11- 15 computers from the Government. The study strongly indicates that the security of the environment surrounding the school influenced ICT integration.

5.5 Recommendations of the study

Based on the study finding, the researcher makes several recommendations;

1. Firstly, the government should introduce compulsory computer training for all principals and teachers. This would equip all the principals with ICT skills.
2. The universities should also make it compulsory for all students training as teachers to take a compulsory unit on computer studies. The academic professional training that teachers and principals undergo should be assessed if it is relevantly meeting the threshold to promote the use and integration of ICT in public secondary schools.
3. The government should also increase its supply of computers to schools and make it compulsory for all schools to integrate ICT in the management tasks as well as build computer laboratories to all the schools. This will enable most schools to acquire computers which can be used for ICT integration in management of the schools.
4. The Ministry of Education should formulate a policy requiring every public secondary school teacher to procure and own a laptop through a government incentive such as subsidy, tax waiver or creation of an affordable laptop loan scheme.

5. All the schools should have internet connectivity to enable principals and teachers to use ICT in the schools. This would help in communication as well as academic research.
6. The schools should also have alternative source of power in places where there is no electricity so as to enable effective ICT integration in school management.
7. The Teachers Service Commission should peg future recruitment and promotions of teachers to those who have undergone ICT training for e-learning and ability to integrate ICT into their duties of management.

5.6 Suggestions for Further Research

This research endeavor might have made a considerable stride in understanding some of the factors that influence ICT integration in management of public secondary schools. The following are suggested areas for further research:

1. This study was done in secondary schools in Kitui County that have functional ICTs. It would be prudent to carry out a study in schools who have not embraced ICT integration to find out the challenges impeding their ICT integration efforts.
2. Further research can be done on a comparative study of ICT integration in the management of schools in other counties.

3. A study can also be done to investigate the impact of the application of Information Communication Technology on the academic performance of public secondary schools in Kenya.
4. Studies can also be done to investigate the role of parents, teachers and sponsors in promoting use and integration of ICT in management of public secondary schools.
5. A study on the strategies for effective and efficient use of ICT in public secondary school.

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APPENDICES
APPENDIX I: Transmittal Letter

Angeline Muli Mutisya

South Eastern Kenya University

P.O Box 170-90200

Kitui

Date 17th July, 2016

Dear respondent,

RE: REQUEST TO FILL QUESTIONNAIRES

I am a student at South Eastern Kenya University pursuing Doctor of philosophy degree in Educational Administration. As part of the requirement for the award of this degree I am conducting a study on factors influencing ICT integration in the management of public secondary schools in Kitui County, Kenya. Your school is one of the schools selected for this study. I therefore humbly request you to assist in filling in the questionnaire. The information you provide will strictly be used for the purpose of this study and your identity will be kept confidential.

Thank you in advance.

Yours faithfully,

Angeline Muli Mutisya

APPENDIX II: Principals Questionnaire

Instruction

The purpose for this study is to investigate the factors influencing ICT integration in management of public secondary schools in Kitui County, Kenya. I do kindly request you to put a tick against your appropriate choice from the options given in the questions below and indicate your opinion in the open questions.

Section I: Bio Data of the Respondents

1. What is your gender? (a) Male () (b) Female ()
2. What is your age bracket in years?
 - (a) Below 25 ()
 - (b) 25 – 30 ()
 - (c) 31-35 ()
 - (d) 36 -40 ()
 - (e) Above 40 ()
3. What is your highest academic qualification?
 - (a) Diploma () (b) Degree () (c) Masters () (d) PhD ()
4. For how long have you been a teacher? Please state in years _____

5. What is the type of your school?

- (a) Boys boarding () (b) Girls' boarding () (c) Mixed boarding ()
(d) Mixed day ()

Section II: Extent of ICT Integration in Management of Public Secondary Schools

6. How often do you use ICT in school management?

- (a) On daily basis ()
(b) Twice a week ()
(c) Once a month ()

7. Indicate the extent to which the school management uses ICT in the following areas, (using a scale of 1 – Great Extent, 2- Some Extent, 3- Undecided, 4 – Less Extent, 5 No Extent).

ICT Integration	1	2	3	4	5
Accounting					
Personnel management					
Students registration records					
Timetabling					
Internal exams					
Record of physical materials					
Library records					

8. On average, how often do you use Internet in school management?
- (a) Every day ()
- (b) Some time ()
- (c) Never ()
9. How can principals improve ICT integration in management of schools?
- (a) Training more staff ()
- (b) Buying more computers ()
- (c) Introduction of teaching of computer ()

SECTION III: Principal Related Factors and ICT Integration

10. What principals' related factors do you think influences ICT integration in school management?
-
-
11. To what extent do the principals' characteristics influence ICT integration in school management?
- (a) Great extent ()
- (b) Some extent ()
- (c) less extent ()
- (d) No extent ()

SECTION IV: School Related Factors and ICT Integration

12. How many functional computers do you have in your school?

(a) 1 - 5 ()

(b) 6 - 10 ()

(c) 10 - 15 ()

(d) 16 - 20 ()

(e) More than 20 ()

13. Where do you mostly access ICT resources?

(a) School ICT laboratory ()

(b) Office ()

(c) Home ()

(d) Cyber café ()

(e) Others

14. Indicate the extent to which the availability of following ICT infrastructure influence ICT integration, (using a scale of 1 – Great Extent, 2- Some Extent, 3 –Un-decided, 4 - Less Extent, 5-No extent).

Internet	1	2	3	4	5
Projectors					
Computers(desk tops, laptops)					
Printers					
Technical support					
Record of physical materials					

15. Which is the major school related factor that influence principals in integration of ICT in management of schools?

- (a) Lack of adequate ICT facilities (e.g computers) ()
- (b) Financial constraints ()
- (c) Inadequate trained Personnel ()
- (d) Out dated software ()
- (e) Others, specify

SECTION V: Community Related Factors and ICT Integration

14. What is the major source of your computers?

- a) Parents ()
- b) Community ()
- c) Government ()
- d) Donations ()
- e) Others

15. How many computers did you receive from this source?

- (a) Less than 5 ()
- (a) 5 – 10 ()
- (c) 11- 15 ()
- (d) 16- 20 ()
- (e) Above 20 ()

16. To what extend does the community support influence ICT integration in your school?

- (a) Great extent ()
- (b) Moderate extent ()
- (c) Undecided ()
- (d) Less extent ()
- (e) No extent ()

17. To what extent does the neighbourhood security influence ICT integration in your school?

(a) Great extent ()

(b) Moderate extent ()

(c) Undecided ()

(d) Less extent ()

(e) No extent ()

18. Give reasons for your answer in number 17 above.

.....

.....

.....

The end

Thank you.

APPENDIX III: Senior teachers' Questionnaire

Instruction

The purpose for this study is to investigate the factors influencing ICT integration in management of public secondary schools in Kitui County, Kenya. I do kindly request you to put a tick against your appropriate choice from the options given in the questions below and indicate your opinion in the open questions.

SECTION I: Bio Data of the Respondents

1. What is your gender? (a) Male () (b) Female ()

2. What is your age bracket in years?

(a) Below 25 ()

(b) 25 – 30 ()

(c) 31-35 ()

(d) 36 -40 ()

(e) Above 40 ()

3. What is your highest academic qualification?

(b) Diploma () (b) Degree () (c) Masters () (d) Ph.D ()

4. For how long have you been a senior teacher in this school? Please state in years

.....
.....

SECTION II: Extent of ICT Integration in Management of Public Secondary

Schools

5. How often do you use ICT in school management?

(a) On daily basis ()

(b) Twice a week ()

(c) Once per month ()

6. How can principals improve ICT integration in management of schools?

a) Training more staff ()

b) Buying more computers ()

c) Teaching computer classes ()

7. Indicate the extent to which ICT has been integrated in the management of the following physical resources in your school, (using a scale of 1 – Great Extend, 2- Some Extend, 3- Undecided, 4 -Less Extend, 5-No extent).

Resource	1	2	3	4	5
Books (Text/Exercise)					
Classroom facilities					
Lab facilities					
Kitchen facilities					
Sports facilities					

8. Indicate the extent to which the school management uses ICT in the following areas, (using a scale of 1 – Great Extent, 2- Some Extent, 3 – Undecided, 4 - less Extent. 5-No extent).

ICT use	1	2	3	4	5
Communication with teachers					
Keeping teachers records					
Communication with parents					
Timetabling					
Internal exams					

9. On average, how often do you use Internet?

- a) Always ()
- b) Some time ()
- c) Never ()
- d) Others

10. How can principals improve ICT use in their schools?

- a) Training more staff. ()
- b) Buying more computers. ()
- c) Introduction of teaching of computer. ()
- d) Internet connection. ()
- e) Others

SECTION III: Principal Related Factors and ICT Integration

11. What principals’ personal characteristics do you think influence ICT integration in school management?

.....
.....

12. Which of the principal related factors below have the greatest influence on ICT integration?

- (a) Age ()
- (b) Gender ()
- (c) Level of Education ()
- (d) Professional Experience ()

13. Give reasons for your response in question 12 above.....

.....
.....

SECTION IV: School Related Factors and ICT Integration

14. How many functional computers do you have in your school?

- (a) 1 - 5 ()
- (b) 6 - 10 ()
- (c) 10 -15 ()
- (d) 16 -20 ()
- (e) More than 20 ()

15. Please indicate your level of agreement or disagreement by ticking (✓) the appropriate response using the following key.

1 -Strongly Agree, 2 -Agree, 3-Undecided, 4- Disagree, 5- Strongly Disagree.

Statement	1	2	3	4	5
The school location influences ICT integration					
The school type (boys/girls, day/boarding, mixed) influences ICT integration					
Teachers ICT skills influence ICT integration					
School computer technician influence ICT integration					

SECTION V: Community Related Factors and ICT Integration

16. How does the community support ICT integration in yours school?

.....

.....

.....

17. What is the major source of your school computers?

- a) Parents ()
- b) Community ()
- c) Government ()
- d) Donations ()
- e) Others ()

18. How many computers did you receive from this source?

(a) Less than 5 ()

(b) 5 – 10 ()

(c) 11- 15 ()

(d) 16- 20 ()

(e) Above 20 ()

19. To what extent does the school neighbourhood security influence ICT integration in your school?

a) Great extent ()

b) Moderate extent ()

c) No extent ()

20. Give reasons for your answer in number 19 above.

.....

.....

.....

APPENDIX IV: Questionnaire for Teachers

Instruction

The purpose for this study is to investigate the factors influencing ICT integration in the management of public secondary schools in Kitui County, Kenya. I do kindly request you to put a tick against your appropriate choice from the options given in the questions below and indicate your opinion in the open questions.

SECTION I: Bio Data of the Respondents

1. What is your gender?

(a) Male () (b) Female ()

2. What is your age bracket in years?

(a) Below 25 ()

(b) 25 – 30 ()

(c) 31-35 ()

(d) 36 -40 ()

(e) Above 40 ()

3. What is your highest academic qualification?

(a) Diploma () (b) Degree () (c) Masters () (d) Ph.D ()

4. For how long have you been a teacher? Please state in years

.....

5. What is the type of your school?

- (a) Boys boarding () (b) Girls' boarding () (c) Mixed boarding ()
(d) Mixed day ()

SECTION II: Extent of ICT Integration in Management of Public Secondary Schools

6. How often does the principal use ICT when communicating to teachers?

- (a) On daily basis ()
(b) Twice a week ()
(c) Once per month ()

7. Indicate the extent to which the school management uses ICT in the following areas, (using a scale of 1 – Great extent, 2- some extent 3 – Undecided, 4 – Less extent, 5-No extent).

ICT use	1	2	3	4	5
Communication with teachers					
Keeping teachers records					
Communication with parents					
Timetabling					
Internal exams					

8. What challenges do you encounter in adopting ICT in your school?

.....
.....

SECTION III: Principal Related Factors and ICT Integration

9. To what extent do the principals' characteristics influence ICT integration in school management?

- a. Great extent ()
- b. Some extent ()
- c. Undecided ()
- d. less extent ()
- e. No extent ()

10. Which of the principal related factors below have the greatest influence on ICT integration?

- (a) Age ()
- (b) Gender ()
- (c) Education level ()
- (d) Professional Experience ()

11. Give reasons for your response in question 10 above.

.....

.....

SECTION IV: School Related Factors and ICT Integration

12. How many functional computers do you have in your school?

- (a) 1 - 5 ()
- (b) 6 - 10 ()
- (c) 10 - 15 ()
- (d) 16 - 20 ()
- (e) More than 20 ()

13. Where do you mostly access ICT resources?

- (a) None ()
- (b) School ICT laboratory ()
- (c) Office ()
- (d) Home ()
- (e) Cyber café ()

14. Which is the major school related factor that influence principals in integration of ICT in management of schools?

- (a) Lack of adequate ICT facilities (e.g computers) ()
- (b) Financial constraints ()
- (c) Inadequate trained Personnel ()
- (d) Out dated software ()
- (e) Others, specify ()

SECTION V: Community Related Factors and ICT Integration

14. How does the community support ICT integration in your school?

- (a) Donations ()
- (b) Security ()
- (c) Advice ()

15. How many computers did you receive from the community?

- (a) Less than 5 ()
- (b) 5 – 10 ()
- (c) 11- 15 ()
- (d) 16- 20 ()
- (e) Above 20 ()

16. To what extend does the neighbourhood security influence ICT integration in your school?

- a. Great extent ()
- b. Moderate extent ()
- c. No extent ()

17. Give reasons for your answer in number 17 above.

.....

.....

The end

Thank you.

APPENDIX V: Interview Schedule for the County Director of Education.

1. How long have you served in your current capacity in this County?
2. Do principals in Kitui county use ICT in school management?
3. If yes how?
4. How does the principals' characteristics which include; age, gender, education level and experience influence principals' integration of ICT in management of public secondary schools in Kitui County?
5. Which school related factors influence the integration of ICT in secondary school management?
6. How does the community support ICT integration in the management of public secondary schools in Kitui County?
7. What is the major source of computers for secondary schools in Kitui County?

THANK YOU FOR YOUR CO OPERATION

APPENDIX VI: Interview Schedule for the Sub-county Director of Education.

8. How long have you served in your current capacity in this County?
9. Do principals in Kitui county use ICT in school management?
10. If yes how?
11. How does the principals' characteristics which include; age, gender, education level and experience influence principals' integration of ICT in management of public secondary schools in Kitui County?
12. Which school related factors influence the integration of ICT in secondary school management?
13. How does the community support ICT integration in the management of public secondary schools in Kitui County?
14. What is the major source of computers for secondary schools in Kitui County?

THANK YOU FOR YOUR CO OPERATION

APPENDIX VII; Determination of Sample Size

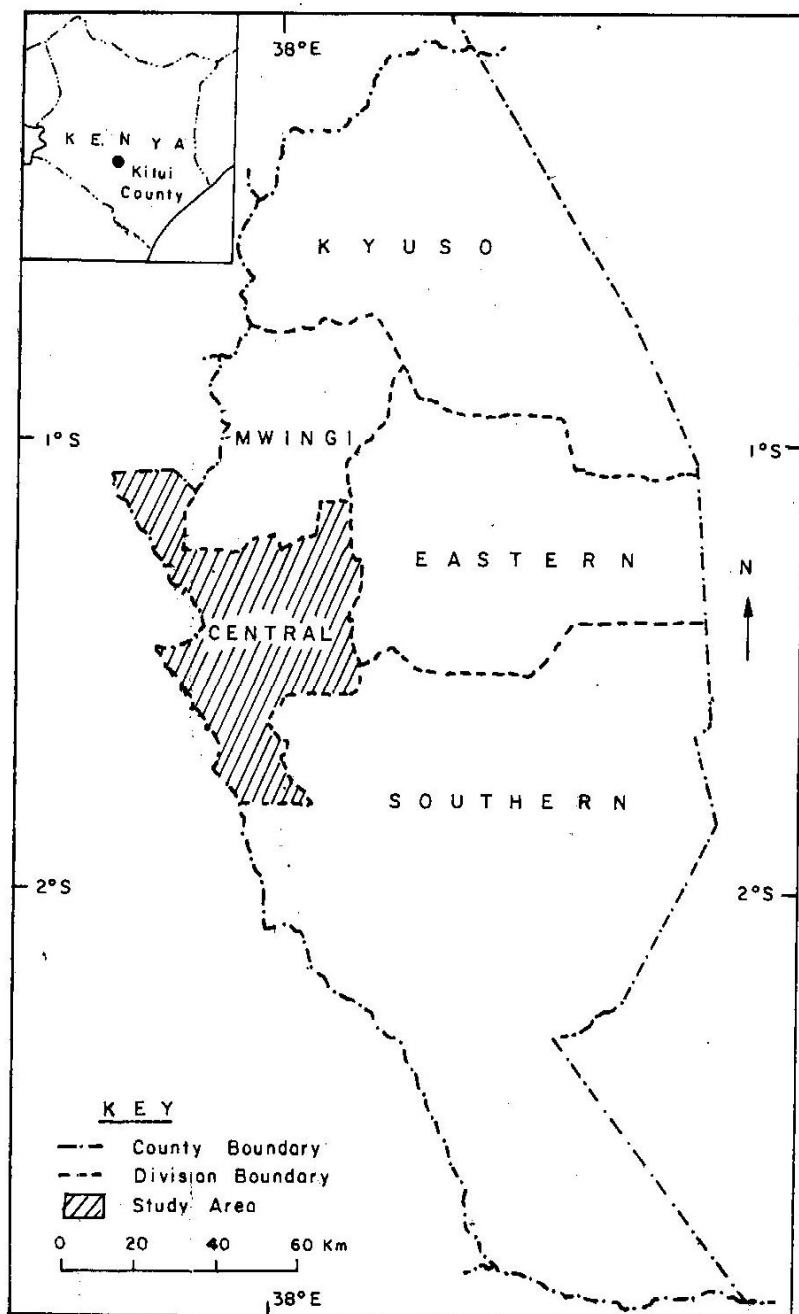
The size of the population and amount of error determines the size of a randomly selected sample. This table helps the researcher determine (with 95 percent certainty) what the results would have been if the entire population had been surveyed.

Table for determining the Random Sample size from a determined population.

Population	Sample size	Population	Sample size
10	10	460	210
15	14	480	214
20	19	500	217
25	24	550	226
30	28	600	234
35	32	650	242
40	36	700	248
45	40	750	254
50	44	800	260
55	48	850	255
60	52	900	269
65	56	950	274
70	59	1000	278
75	63	1100	285
80	66	1200	291
85	70	1300	297
90	73	1400	302
95	76	1500	306
100	80	1600	310
110	86	1700	313
120	92	1800	317
130	97	1900	320
140	103	2000	322
150	108	2200	327
160	113	2400	331
170	118	2600	335
180	123	2800	338
190	127	3000	341
200	132	3500	346
210	136	4000	351
220	140	4500	354
230	144	5000	357
240	148	6000	361
250	152	7000	364
260	155	8000	367
270	159	9000	368
280	162	10000	370
290	165	15000	375
300	169	20000	377
320	175	30000	379
340	181	40000	380
360	186	50000	381
380	191	75000	382
400	196	1,000,000	384
420	201		
440	205		

Source: Krejcie, R. V and Morgan D.W. Determining sample size for Research activities. Educational and Psychological Measurement, 30,607-610.

APPENDIX VIII: Map of Kitui County



APPENDIX IX: Permission to Collect Data



SOUTH EASTERN KENYA UNIVERSITY OFFICE OF THE DIRECTOR BOARD OF POST GRADUATE STUDIES

P.O. BOX 170-90200
KITUI, KENYA
Email: info@seku.ac.ke

TEL: 020-2413859 (KITUI)
: 020-2531395 (NAIROBI)
Email: bps@seku.ac.ke

Our Ref: E70/KIT/30009/2013

Date: Wednesday, July 27, 2016

Mutisya Angeline Muli
Reg. No. E70/KIT/30009/2013
C/O Dean, School of Education

Dear Mutisya,

RE: PERMISSION TO COLLECT DATA

This is to acknowledge receipt of your Doctor of Philosophy in Educational Administration and Planning Proposal document entitled, *"Factors influencing the integration of information communication technology in management of public secondary schools in Kitui County, Kenya"*. Following a successful presentation of your Ph.D Proposal, the School of Education in conjunction with the Directorate, Board of Post graduate Studies (BPS) have approved that you proceed on and carry out your research data collection in accordance with your approved proposal.

During your research work, you will be closely supervised by Dr. David Mulwa and Dr. Jonathan Mwanja. You should ensure that you liaise with your supervisors at all times. In addition, you are required to fill in a Progress Report (SEKU/ARSA/BPS/F-02) which can be downloaded from the University Website.

The Board of Postgraduate Studies wishes you well and a successful research data collection as a critical stage in your Master of Education in Educational Administration and Planning.

Prof. Cornelius Wanjala
Director, Board of Postgraduate Studies

Copy to: Deputy Vice-Chancellor, Academic, Research and Students Affairs
Dean, School of Education
Chairman, Department of Educational Administration and Planning
Dr. David Mulwa (Dept. Educational Management & Curriculum Development)
Dr. Jonathan Mwanja (Dept. Educational Psychology)
Director, Kitui
BPS Office -To file

CW/mlv

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TECHNOLOGY AND INNOVATION**

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When replying Please quote

9th Floor, Utalii House
Uhuru Highway
P. O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:

NACOSTI/P/16/94225/14151

10th October, 2016

Angeline Muli Mutisya
South Eastern Kenya University
P.O. Box 170-90200
KITUI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Factors influencing the integration of Information Communication Technology in management of public secondary schools in Kitui County Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kitui County** for the period ending **10th October, 2017.**

You are advised to report to **the County Commissioner and the County Director of Education, Kitui County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kitui County.

The County Director of Education
Kitui County.

THIS IS TO CERTIFY THAT:

**MS. ANGELINE MULI MUTISYA
of SOUTH EASTERN KENYA UNIVERSITY,
0-90200 Kitui, has been permitted to
conduct research in Kitui County**

Permit No : NACOSTI/P/16/94225/14151

Date Of Issue : 10th October, 2016

Fee Recieved : ksh 2000

**on the topic: FACTORS INFLUENCING
THE INTEGRATION OF INFORMATION
COMMUNICATION TECHNOLOGY IN
MANAGEMENT OF PUBLIC SECONDARY
SCHOOLS IN KITUI COUNTY KENYA**

**for the period ending:
10th October, 2017**



**Applicant's
Signature**

**Director General
National Commission for Science,
Technology & Innovation**

CONDITIONS

- 1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.**
- 2. Government Officer will not be interviewed without prior appointment.**
- 3. No questionnaire will be used unless it has been approved.**
- 4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.**
- 5. You are required to submit at least two(2) hard copies and one (1) soft copy of your final report.**
- 6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice**



REPUBLIC OF KENYA



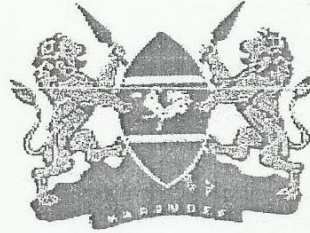
**National Commission for Science,
Technology and Innovation**

RESEACH CLEARANCE

PERMIT

Serial No. A 11223

CONDITIONS: see back page



THE PRESIDENCY

MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telegrams "DC" Kitui
Telephone 22004/22010
Fax - 04444 23260
Email - cckitui@gmail.com

COUNTY COMMISSIONER
KITUI COUNTY
P. O. BOX 1,
KITUI

Ref No: K.C.603/II/115

17th October, 2016

Mutisya Angeline Muli
Reg.NO. E7O/KIT/30009/2013
C/O DEAN, SCHOOL OF EDUCATION

RE: PERMISSION TO COLLECT DATA

Following your application to collect data on "*Factors influencing the integration of information communication technology in management of public secondary schools in Kitui County*".

You are hereby permitted to carry out the above research in Kitui County.

ODIDI J. OTIENO,
FOR: COUNTY COMMISSIONER,
KITUI COUNTY
CC
County Director of Education

All Deputy County Commissioner's
KITUI COUNTY

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
State Department for Education

Telegrams "EDUCATION" Kitui
Telephone: Kitui 22759
Fax :04444-22103
E-Mail : cde.kitui@gmail.com



REPUBLIC OF KENYA

COUNTY EDUCATION OFFICE
KITUI COUNTY
P.O BOX 1557-90200
KITUI

When replying please quote;

Ref. No: KTIC/ED/RES/22/181

Date: 24/10/2016

MUTISYA ANGELINE MULI
REG.NO.E70/KIT/30009/2013
SOUTH EASTERN KENYA UNIVERSITY

RE: RESEARCH AUTHORIZATION

Following your application for authority to conduct a research on **"Factors Influencing the Integration of Information Communication Technology in Management of public secondary schools in Kitui County, Kenya"** I am pleased to inform you that permission has been granted.

You are advised to liaise with the respective Sub County Directors of Education before embarking on the exercise.

Regards,

BRIDGET WAMBUA (MRS)
DEPUTY COUNTY DIRECTOR OF EDUCATION
FOR: COUNTY DIRECTOR OF EDUCATION,
KITUI COUNTY.

